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TABLE OF CONTENTS

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INDUSTRIAL-ARTS MAGAZINE

Vol. VI MAY, 1917 No. 5

The Senior High School: Its Function and Organization*

Frank V. Thompson, Assistant Superintendent of Schools
Boston, Mass.

PRESENT and coming national and social ideals promise to modify profoundly our former notions of educational procedure. The idea of universal obligation—military, industrial or otherwise, shows that service rather than consumption or appreciation primarily is the idea, the results of which will bring national survival. The older days of individualism whether vocational, educational or industrial, are going—the last frontiers anywhere in the world are disappearing—they have disappeared for us already. Art for art's sake has long been questioned as a paramount educational ideal, and education for education's sake is now before the bar for judgment. The general high school which maintains merely a collection of disassociated subjects which pupils may choose for presumed disciplinary or uninterpreted values will have difficulty in explaining or justifying its procedure. Secondary education of a general character may be defended as useful, but society demands that our public educational institutions justify themselves on a higher plane. Our public schools must show that they are rendering service on the highest plane that intelligence, financial resources and public consent will permit. We will be content only with institutions which are as good as human ingenuity can effect.

If our high schools are to heed the present call for service, industrial, commercial, professional, or what not, a strengthening of purpose, a liberality of outlook, a willingness for readjustment must come. This does not mean the immediate or ultimate conversion of present resources to the purposes of industrial education, but in part for purposes of industrial education, in part for purposes of professional education, in part for purposes of agricultural education, and for other educational purposes as well—each in proportion to community, state and national needs, and in proportion to individual capacity. It is obviously as absurd to convert our schools into agencies for meeting only one specific demand as to meet the need of no specific demand. We need to get and keep a sense of the proportion.

In the present and coming readjustment the matter of organization is paramount. Good-will alone cannot bring efficient results. Our past organization was adopted for past endeavors, but not adopted for those at hand and ahead. Education for general purposes does not require subdivision of forces, but education for specific purposes will necessitate a differentiation of organization. The modern elective high school has taken pride in its rich offering of options—a hundred subjects, all on the same plane, and each given similar values in credits or points. Graduation is conditional upon quantitative achievement in subjects not analyzed as to social or utility values.

In the coming high school the student will select a curriculum, but not an unregulated number of disassociated subjects. A better sense of values will need to be developed. The neglected qualitative factor will receive recognition, qualitative in the sense of fundamental character, not merely in the matter of grading.

We are coming to analyze the complexus of educational values into three units in the following order,—one, a social value, one, an individual value, and the last, a disciplinary value. The order just stated is the reverse of what was formerly considered appropriate. These values are by no means distinct for they are invariably found in differing degrees simultaneously in the same subject. The matter of proportion is essential. The complexus of values of a school subject may be represented by a geometrical figure of three dimensions. The dimensions of the plane of the base supposedly may be the product of the social and individual factors, while the disciplinary value may be supposed to represent the altitude of the figure. Our sense of values will tell us how we wish to arrange our geometrical figure. The formal disciplinarian will wish to erect a high altitude, while the believer in specific values will wish to erect a broad base. Each is striving for the same result, namely, content, capacity, power.

The third or disciplinary value has never emerged from the confusion of controversy, but yet assumptions as to its place have been the most potent forces in determining the character of educational institutions. Two of the three educational values are more determinate and are vital in present educational procedure. Educational values which have to do with

*Read before the National Society for the Promotion of Industrial Education, Indianapolis, February 24, 1917.

social needs and individual capacities are pragmatically accepted today, and it is our task to construct educational procedure which will permit of their realization. Hence the organization of the general or cosmopolitan high school will need to undergo real change. The senior high school needs to be reorganized upon a curriculum basis instead of the subject or subject–department basis. The university with its separate schools or the industrial organization with distinct departments make competent analogies for what is needed as effective organization in the senior high school.

We shall require heads for curriculums instead of subject-heads, or perhaps both kinds of heads with co-ordinated functions. The substituted curriculum or sub-school for particular purpose should represent in miniature the separate special school which attempts a single purpose. Effective results in specific achievements may be expected with such a procedure; the separate roof is not necessary for differentiation of purpose, but separateness of aim is essential and this a department may have as well as the special school. The principal of a high school with several curriculums need not himself be a specialist in each of the projects of his school, but he should be capable of determining the kind of result which each curriculum should produce, and should have impartial sympathy with the needs and aims of each project committed to his care. Our principals in the past have played favorites, unconsciously no doubt. Certain aims of the course have appeared more important to them. Oftentimes the college section, usually the smallest, has been given undue fostering care. The principal today must be judicial and impartial. Society is his master and he is its servant. This is the gospel of service which he teaches his pupils. Society needs college graduates, engineers, teachers and needs workers, farmers and clerks. The ambition of the pupil for one vocation is as much to be respected as the ambition for another, and efficient training in the vocational course is as essential as in college preparatory classes. Equal treatment for the individual is recognized before the courts and must be in the schoolroom.

There is still doubt that the high school should offer specialized courses on the ground that the pupil may choose unwisely and commit himself unwittingly to a course which subsequently may prove disadvantageous. This doubt has never been applied to those who chose college preparation on the assumption, apparently, that no pupil can make a mistake in electing to go to college. From the doubt that any specialization except one may be permitted to pupils in high school, some communities have adhered to general education by means of options among subjects. A more popular practice is seen where choice has been permitted in certain fields, such as commercial and manual training courses, with large components of general subjects. The result is a situation where the specialized achievements never attain standards of vocational utility and is neither good specialized education nor good general education, a straddle which elicits the condemnation of both the culturist and the utilitarian.

The adoption of the junior high school plan renders less probable improper and ill-considered choice in the senior high school. The prevocational purpose of the junior high school promises to furnish the basis for suitable choice of curriculum in the senior high school. We recognize today that the basis of prevocational work is broader than that of a single vocation. Each pupil should be given a variety of prevocational experiences and as a result of comparison, guidance and self-activity many pupils will make a final choice which is vocational in aim. A vocation must be in one field. The pupil should come from the junior high school with a fair idea of choice. In the senior high school the student should pursue his work in the chosen field. He may change even then, but we must expect such a change to entail a loss of time. Courses cannot be general and special at the same time. The student who spends one year in the medical school and then decides to become a lawyer must of consequence begin in the first year of a law school. Real vocational or specialized courses in the senior high school entail the same procedure. Perhaps the greatest work of the junior high school will be found that of vocational guidance based upon experiment, self-estimating, and wise counsel. The senior high school if it is to perform its function properly, must proceed upon the assumption that students have made a wise choice and enter, as a consequence, a curriculum with a definite objective. The continuous insurance against mistaken choice by keeping all courses with large general elements so that interchange may be easy will defeat the greater principle which is efficiency of attainment.

Prevocational work is far wider in scope than many administrators recognize. Prevocational education, like vocational education has to do with all vocations—commercial, professional, industrial, agricultural and other. The term has been popularly used with the restriction to industrial vocations. The term prevocational is not properly applied to a single type of school, but is more properly applied to all educational endeavor at a certain stage of progress, hence, we may properly state that the function of the junior high school is largely prevocational.

A city like Boston or Indianapolis may wisely transform general high schools with confused or undefined aims into institutions with clearer and more useful functions. Assuming that students come from junior high schools with fairly well defined aims, they should, as has been stated, properly expect in the senior high school the facilities for instruction, de-

velopment and training in the things chosen. The senior high school, now commonly known as the general or cosmopolitan high school, can properly seek an organization which makes this procedure feasible. The present group-subject or elective-subject plan will give way to an organization where the curriculum is the unit. The student may still elect but he elects with a purposeful resultant in mind. The means to attain the end may not in each detail appeal to the personal preferences of the aspirant, but unrestricted liberty, egoistic individuality, personal preference, cannot be the controlling factors in life choice in a socialized plan of civilization. Modern life has too much of determinism, economic, industrial, civic, to permit of the justification of choice primarily on the basis of individual enjoyment. Choice today means the weighing and balancing of things pleasurable and irksome, but always with the motive of service and appreciation of fitness—what things do my fellows most need, and what can I best do.

The senior high school, then, should offer the choice of curriculums to students seeking the advantages and preparations which the institution may effect. What shall be the nature of the curriculums offered, and how may they be effectively administered? Obviously the curriculums should be the result of estimating community needs and capacities of students seeking to prepare themselves for needed service. More closely defined the curriculums should be those which lend themselves to the resources and organization of the school, which involve a social utility that is undisputed, which meet demands for considerable recruits—which are suitable to the ages and capacities of high school pupils.

In cities of 100,000 or more, senior high schools may be expected to offer curriculums like the following—a curriculum for service in industry for boys, a curriculum for service in business for boys and girls (separate preferably), a curriculum for service in household arts for girls, a curriculum with wide options for boys and girls with undefined aims; opportunity for college preparation can be provided in this curriculum. The question may properly be raised as to the justification of a curriculum without specific aim. We are not sure that society and the individual will not profit by the continuance of a procedure which has hitherto been most prevailing. In our country alone is there found purely general education in the high school period of instruction. The results of this individual experiment have never been fairly estimated. Speculation regarding the value has been generous, but general education in our high schools has been without competitors until very recently so that we cannot make comparisons. So many extraneous factors enter where comparisons are made between our school system and those of Europe, that such comparisons are always unconvincing.

Insofar as purely general education has overshadowed all other types and prevented specialized types of instruction, restriction should now be made. General education as an optional alternative is a different question. The case against it has not been proved. The general high school, as the name indicates, has largely employed its resources in general education. Present teachers and equipment are not suitable immediately for specialized purposes. Controlling convictions, conservative tendencies, student traditions will of necessity prevent immediate abandonment of general education in the high school. With the introduction of specialized curriculums will come a competition which will furnish norms for comparison, and with the tendencies of modern economic and civic conditions will come forces which will bring evidence for future direction.

Some modifications of purely general courses in high schools may be made at once. The example of Harvard College in the modification of the elective system, as seen in the principle of concentration and distribution of subjects, would seem to point the way to a similar procedure in high schools where elective general courses are to be retained. There would seem to be general agreement that a pupil who graduates from high school should acquire a somewhat comprehensive grasp of some one field or subject, like a modern language—some phase of art, English, mathematics. In addition there is the expectation that the student who is graduated as a generally trained individual should have some acquaintance with the rudiments at least of each of the great divisions of organized knowledge, such as history, etc. Personally I can offer nothing more suggestive as a proper basis for the organization of a general course than the principle of concentration and distribution of subjects as above described. Every pupil may rightly be required to elect a major for concentration, and as many minors as will carry out the principle of distribution to give some knowledge of other fields which convention and experience holds to be worth while.

Just at the present moment we are attempting a confused plan which jumbles general, unrelated subjects with technical or vocational subjects, a sort of prehensile curriculum which is believed to be an adequate means of attaining a specialized aim. This is certainly the situation with respect to commercial and manual training courses quite generally thruout our nation. A recent survey of this situation made by the author for the United States Commissioner of Education gives convincing evidence of the extent of the practice with respect to commercial courses. Summarized broadly, commercial courses in general high schools are made up of general, unrelated subjects and technical or vocational sub-

jects in a proportion of three general, unrelated subjects to one technical or vocational subject.

This kind of high school organization lacks effectiveness in two important ways. First the vocation is taught in an isolated fashion. Instead of each subject and influence supporting the central idea there is a scattering of forces. The central aim of the student is exploited in a single vocational subject. The other subjects may dissipate or weaken the central aim. The unrelated character of the general subjects often causes the pupil to underestimate the value of broad foundations. The non-vocational subjects if conceived and taught as related work would possess an interest and appreciation now lost, or present in a lessened degree. Second, the exigencies of the non-vocational subjects taught as unrelated work govern the possibilities of successful administration of vocational subjects. Where 75 per cent of the pupils' work is in unrelated non-vocational work the methods of administration and organization are certain to be those of general education, and not those of vocational education. The organization and administration of courses in Salesmanship presents an instance in point. Courses in salesmanship are coming into our general high schools on an optional basis with other commercial subjects. Our directors of salesmanship believe that salesmanship must be accompanied by practice work in the stores, sometimes on school days or at continuous periods preceding Christmas or Easter. Program difficulties arise. The high school principal cannot understand why a course calling for 25 per cent of the time should interfere with the administrative scheme designed for courses of a general nature which involve 75 per cent of the time and three-fourths of the credit for which the pupil is working. The week and week plan does not fit the vocational conditions governing salesmanship. The student of salesmanship misses the work of the general classes, the diploma is endangered and trouble is abroad.

The curriculum plan of organization is apparently the only practicable way out. If the senior high school is to teach vocations, the methods and organization of vocational education must be adopted for vocational courses. If the senior high school continues to carry on an inconvenient straddle its position will necessarily be awkward. The result will not be good vocational education, and more than likely not good general education. After all, if communities decide that the function of the general high school is to be modified to include vocational courses, then the means must be furnished. Mass programs are cheaper to administer than differentiated programs. The large high school offers opportunity for more economical administration of differentiated programs than does the small high school. It is likely that we shall find a new justification for the large high school if the curriculum or sub-school method of organization is adopted. The needs of individual pupils may receive small attention in a large general high school, but the individual pupil may be given better attention in a curriculum plan of organization irrespective of the size of the complete organization.

I. Report of the Commissioner of Education, 1916—Chapter on Commercial Education.

Let us assume concretely that high schools which previously have been of the general type on an elective basis attempt reorganization on the curriculum plan. Such questions as these will arise: what proportion of the time shall be given to purely technical or vocational work, what to related technical, what to general or non-vocational subjects? Such questions can be answered only in general terms, since practice regarding diploma credits differs widely in communities and states. In the third and fourth years at least concentration and specialization in the special field must take place if the student is to achieve efficiency standards. Approximately one-half the required time would seem to be required for the specialized aim; another fourth should be devoted to the related technical subjects such as industrial history, economics, commercial law, materials of commerce, a modern language, etc. Another fourth may be general, but here convention may limit choice; the requirement of English or civics is usual in most communities, and may consequently be found generally a requirement. The above arrangement may very likely be a practical result of a curriculum plan of organization. The pupil by such a plan can meet the minimum requirements of the diploma. Additional opportunity for wider choice should be made and the students encouraged to do something outside the limits of specialty and convention. The idea of the avocation, the opportunity for doing something for reasons other than those of utility should be encouraged in an age where the idea of utility is exalted. The vocation must receive emphasis to be sure, but we ought not to erect barriers against the instinct for the unusual, the non-useful, the abstractly artistic. In olden fable the ant was made to rebuke the grasshopper, but we wish our boys and girls to be neither the one nor the other, but with the good qualities of each—industrious like the ant, joyous like the grasshopper. Something entirely different from the curriculum function may be encouraged for the sake of fancy or curiosity. After the day's work is done, men like to play, to relax. The commercial boy may have a great interest in air-planes, or insects, or sketching, and he should have opportunity to exploit his interest insofar as the resources of the school will permit. The curriculum plan based on a minimum requirement, not too rigid to permit of election of something not required will permit the homo-

geneous division where homogeneity is desirable—namely, in the essential vocational, related technical, and non-vocational but conventional requirements. When practice or field work is required then the difficulties of organization will not threaten to disrupt the school as is the case at the present time with heterogeneous divisions. Greater by far than the solving of the program difficulty is the opportunity of appeal to dominant life purpose, to common elements of ambition, and to the same loyalty of service. The homogeneous division gives full chance for the application and spur of standards. The generalized compromise standards necessitated in heterogeneous divisions are no standards at all—no more than the composite picture of many individuals serves to identify any one member of the group. The teaching in the homogeneous group can be clear cut, well aimed, with an assurance of response from all. On the firing line the non-combatant is not welcomed for he is a cumbrance and a distraction—he consumes but he does not contribute.

Let us summarize the important points of our theme. The senior high school will reorganize by abandoning the present plan of options by subjects for the curriculum method which permits of specialized achievements. Regulated general courses on the principle of concentration and distribution will be retained for pupils without specialized vocational aims and for pupils preparing for those higher institutions requiring a kind of preparation to be found best in general subjects. The new procedure means that a pupil should find in the commercial curriculum of the senior high school as good an opportunity for preparation for commercial service as in the special high schools of commerce; he should find as good an opportunity for industrial training as in the separate industrial school. In the vocational curriculum the methods and spirit of vocational education should prevail. The present tendency of attempting to make subjects both general and specific will need to be abandoned. We must make curriculums in fact as well as in name. Divisions of pupils within the curriculum must be homogeneous in essential subjects, whether vocational, related vocational, or non-vocational. The choice of some subject outside the curriculum should be encouraged to satisfy the instinct for things different, to gratify the spirit of adventure, and to embody the principle of democracy which is fostered by associations of one kind of student with other kinds having different life objectives, or having undetermined life aims. Some educators are willing to sacrifice all special aims abjuring the curriculum idea, in order to secure a common tie of sympathy for better citizenship. The principle of efficiency need not be sacrificed in order to secure better citizenship. Efficiency in the group and friendliness outside the group are not incompatible virtues. Abundant illustrations could be cited to prove this fact.

Let it not be forgotten that the educator who builds his educational structure on the broad and ample base of social and individual values is seeking a content as extensive as the disciplinarian who hopes to secure a greater volume by means of a higher altitude. The pragmatist who proceeds with evident factors is sure at least of his base. It cannot be proven that his altitude is not fully as high. A better citizenship, a keener sense of justice, a greater common competence, a more equitable distribution of burdens—these are the ideals of a more perfect society. Educational procedure will be judged in the future as it contributes to the realization of these ideals. Not what a man consumes, but what he contributes will be the exponent of value of the citizen in a socialized scheme of civilization.

Announcement

THE Editors of the Magazine are pleased to announce that arrangements have been made for the publication of an authoritative series of articles on *Period Furniture*. The authors will be Mr. Conrad Weiffenbach, Director of the Woodworking Department of the Technical High School of Buffalo, N. Y., and Mr. Anton Anderson of the same institution. Both men have had experience as commercial designers and as cabinet-makers. They are practical teachers and understand the possibilities and limitations of high and vocational school woodworking shops. They will present designs of historic and artistic value, together with complete working drawings, stock cutting bills, rods, types of construction, etc., in accord with modern factory and school practice. They keep in touch, constantly, with modern factories and their methods, so that the readers will receive this instruction at first hand.

All articles after the first will be printed in lesson plan form, and in a manner that will easily be understood and easy to work from.

Drawings for these articles will be rendered by Mr. Anderson, who has had years of experience in this particular line in some of the factories of Grand Rapids, Mich.

AN ADJUSTABLE PLANING JIG

M. Norcross Stratton, Practical Arts Department, Chestnut Street School, Springfield, Mass.

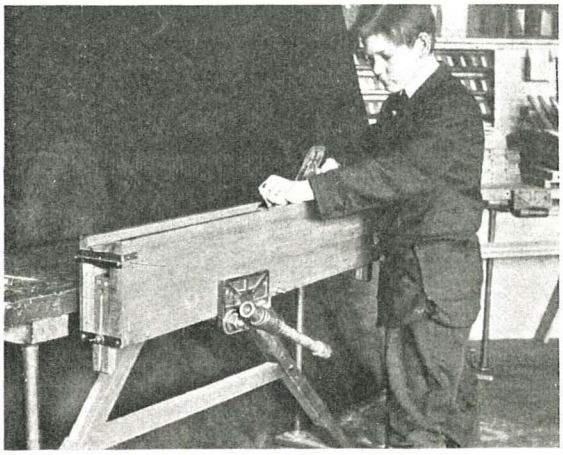
IN an address at the last Eastern Arts Convention, Dr. Kent, of Jersey City, said, apropos of jigs, "What is now needed is an adjustable planing jig for use in our manual-training shops when doing work on the 'shop plan.' "

We have used such a jig for some time in our practical-arts shop and the final improved type is pictured in the accompanying cuts. This jig may be used in planing edges on boards of any width up to ten inches and on any thickness up to $1\frac{1}{2}''$. An ordinary jack plane is used.

The board to be planed is kept in place with wedges and on some of our jigs a lever is used. Our jigs will take boards of any length up to four feet.

The adjusting device consists of a movable base supported by three grooved guides. A bolt with a wing nut locks the guides at the desired height, keeping the base firm for the job. The guide or brace in the center prevents sagging.

The plane runs on two hardwood strips, or tracks, fastened to the sides of the jig. The sides extend above the track, keeping the plane in place. (See end view of jig.)



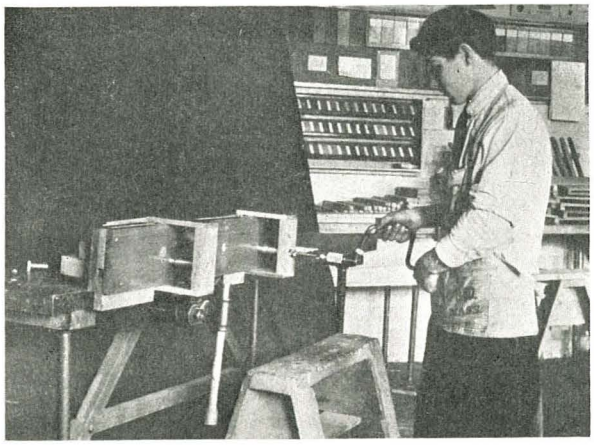
Planing a Board in the Stratton Adjustable Jig.

The sides are made of $\frac{7}{8}''$ white wood and the track, movable bottom and braces are of $\frac{1}{2}''$ and $\frac{7}{8}''$ maple. Strips of $\frac{1}{2}''$x$\frac{1}{8}''$ band iron are screwed upon the ends to brace the jig and to keep the board to be planed from sliding out at the end.

In our shops there are now ten jigs of this pattern in operation and all were made by the boys. Boards may be planed, tapered by adjusting one end of the jig higher than the other.

It is not the purpose of this article to discuss the educational value of jigs or to put forth arguments in their favor but in making fifty sleds, one hundred swings, one hundred go-cycles, fifty filing boxes and many other articles the jigs were of unquestioned value. They enabled us to quickly turn out duplicate parts and finally a good marketable product.

The boys had a correct impression of how a board looks when properly planed and were obliged to plane

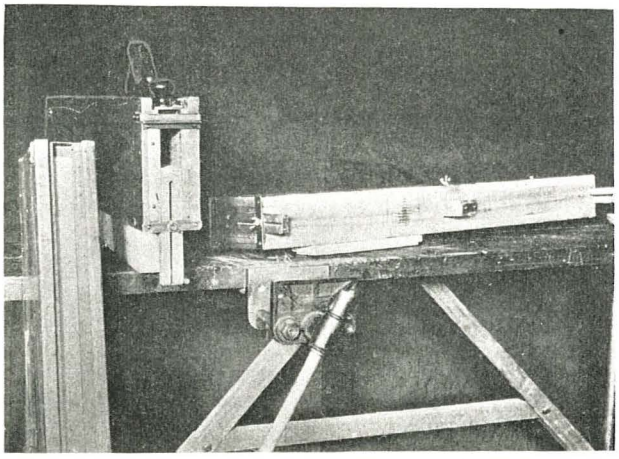


The Boring Jig.

in the correct position. The jigs gave the boys an idea of how work is turned out in a commercial shop with machinery, these taking the place of machines. After using jigs I have found that the boys usually assume the correct position when planing without jigs which, in itself, justifies their use to my mind. In making the sleds we used a boring jig, pictured in the cut, for boring holes for braces and handles.

For a regular manual-training shop the jigs may be made shorter, say two feet long. We have recently made several of this size and also one considerably longer in which a jointer plane is used.

We used, with great success, a bottomless jointing jig in which we planed 10″ boards for making one hundred desk tops—the tops being 20″ wide when jointed up.



Three Views of the Stratton Adjustable Jig.

Development of Water Color in Primary Grades

Eighth Article

Martin F. Gleason, Supervisor of Art and Construction, Joliet, Ill.

Booklet Making in Connection With Water Color Development.

THERE is no teacher who knows the value of drill in various subjects better than the one who works with primary children, because it falls to her lot to fix many facts in the minds of the little ones who come under her care. Any one who recognizes the value of such work, never loses sight of the fact that it must be made interesting and also that system will do much for the efficiency of the drill. The wise teacher is continually looking about for ways of developing these two qualities.

In our own school days, when we were students instead of teachers, those of us who kept note books, bearing on any subject, have had that subject more definitely and lastingly fixed in our minds because of the systematic recording of whatever seemed desirable of retaining. The extra time required for the hand to do this recording kept our minds working systematically on the subject and this was instrumental in making the right kind of impression.

Children of the primary grades should do much bookmaking in connection with their work, and keep those made growing as the subjects develop. Children are very fond of these little books, which are all their own. They enjoy the making and the growth from day to day or week to week as the case may be. And, as with more advanced people, going thru the necessary processes helps to fix in their minds the development of whatever work is being done. Interest, too, is maintained and children keep looking forward to the completion of the development as a whole. When the books are finished they stand as evidence of growth and the children and teacher have a feeling of satisfaction.

It is possible to make a number of interesting and valuable books in any or all of the primary grades, bringing into co-operation the subjects of construction, painting, design, nature study and language. Illustrations will tell much more effectively about this line of work than will descriptive matter and for that reason this section will contain much of the former and little of the latter.

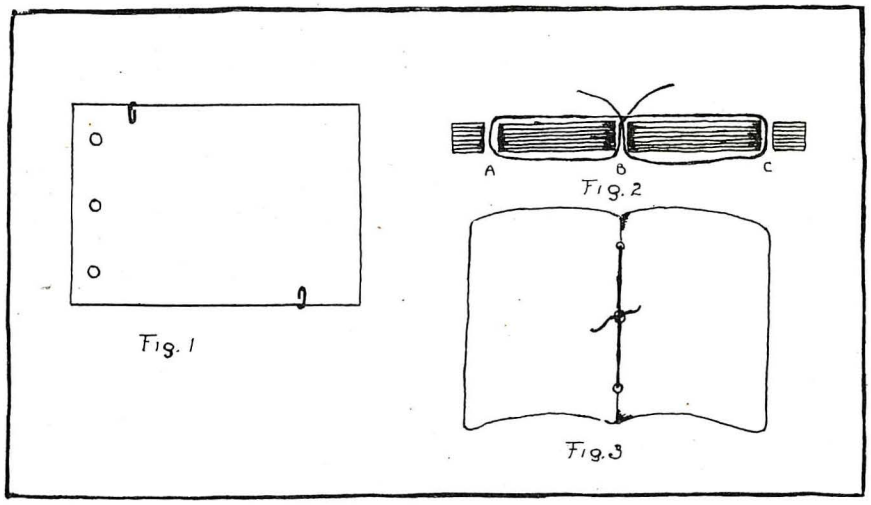


PLATE XLI.

It seems advisable to use such books, as those which will be suggested, largely as mounting books in the first three grades. There is much less danger of spoiling the book when the work to be put into it is done on separate pieces of paper and then mounted. When covers are to be decorated, it will be found a good plan to have the design made on a piece of paper suitable in size and tone and then pasted to the cover. Lining papers may be made and pasted in the same way.

It is not at all necessary to use expensive papers in these little books. Tinted papers, neutral in tone, such as most school supply houses carry, or common drawing paper may be used. Gray drawing paper makes a better mounting surface than cream colored.

The mechanical processes necessary for the construction of these books vary. The sheets of paper used may be held together with paper fasteners, tied together thru punched holes, or sewn. In some beginning classes of first grade, before the children are able to do much with their fingers, the teacher pins a few folded sheets of paper together, thus forming a simple little book.

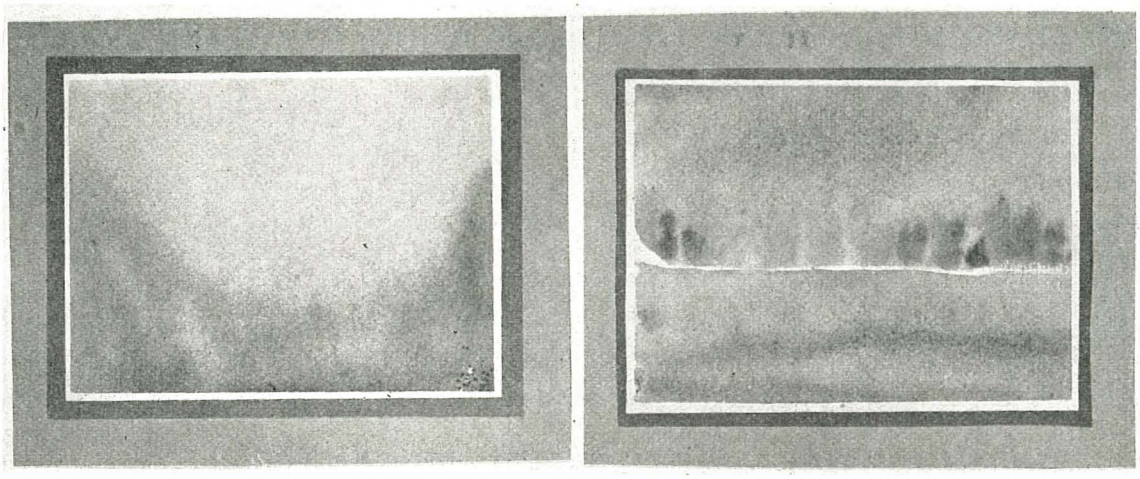


PLATE XLII.

Plate XLI shows how a book may be made by tying. Fig. I illustrates the way the paper should be punched. It also illustrates method of holding the several sheets together so that the holes of the different sheets will come one directly over the other. This plan also helps to insure good edges. Common carpet warp may be used for tying. In color this should harmonize with paper used. Fig. 2 represents end of book, the perpendicular openings A, B, C suggesting the punched holes. In tying, begin at B and pull string, all but about three inches, thru this hole. From B go over to and up thru A and then over to and down thru C. From C go over to B and up thru this hole. The illustration shows that the string last drawn thru B is on one side of the long stitch from A to C. The end left extending in the first move is on the opposite side. These two ends should now be tied together in a hard knot.

The process of sewing a book is much the same as the one used in tying. After the sheets have been firmly fastened together with paper clips the holes may be punched with the needle, so the child may see on either side where the needle is to go. Carpet warp and large darning needles, or book-

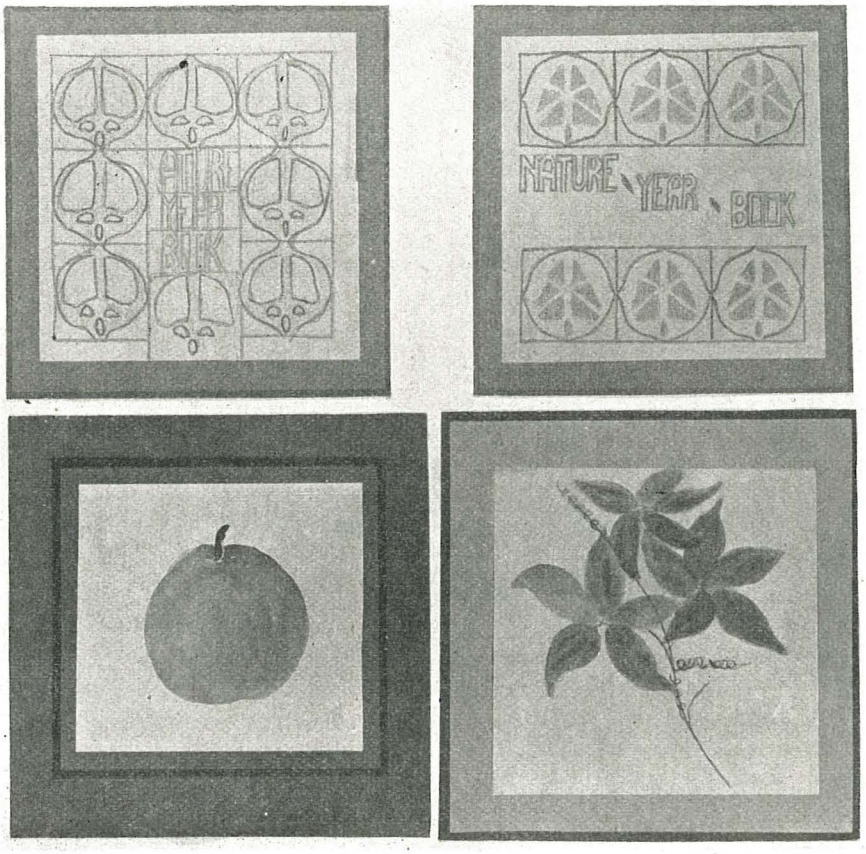


PLATE XLIV.
Top Row—Figs. 1 and 2. Bottom Row—Figs. 3 and 4.

binder's linen thread and smaller needles may be used. Fig. 3, Plate XLI, illustrates the folding and sewing of a book.

The use of the book and the grade in which it is to be used determines the size. Do not try to have first-grade children make too large a book. The 6″x9″ or the 9″x12″ drawing paper folds into suitable sizes.

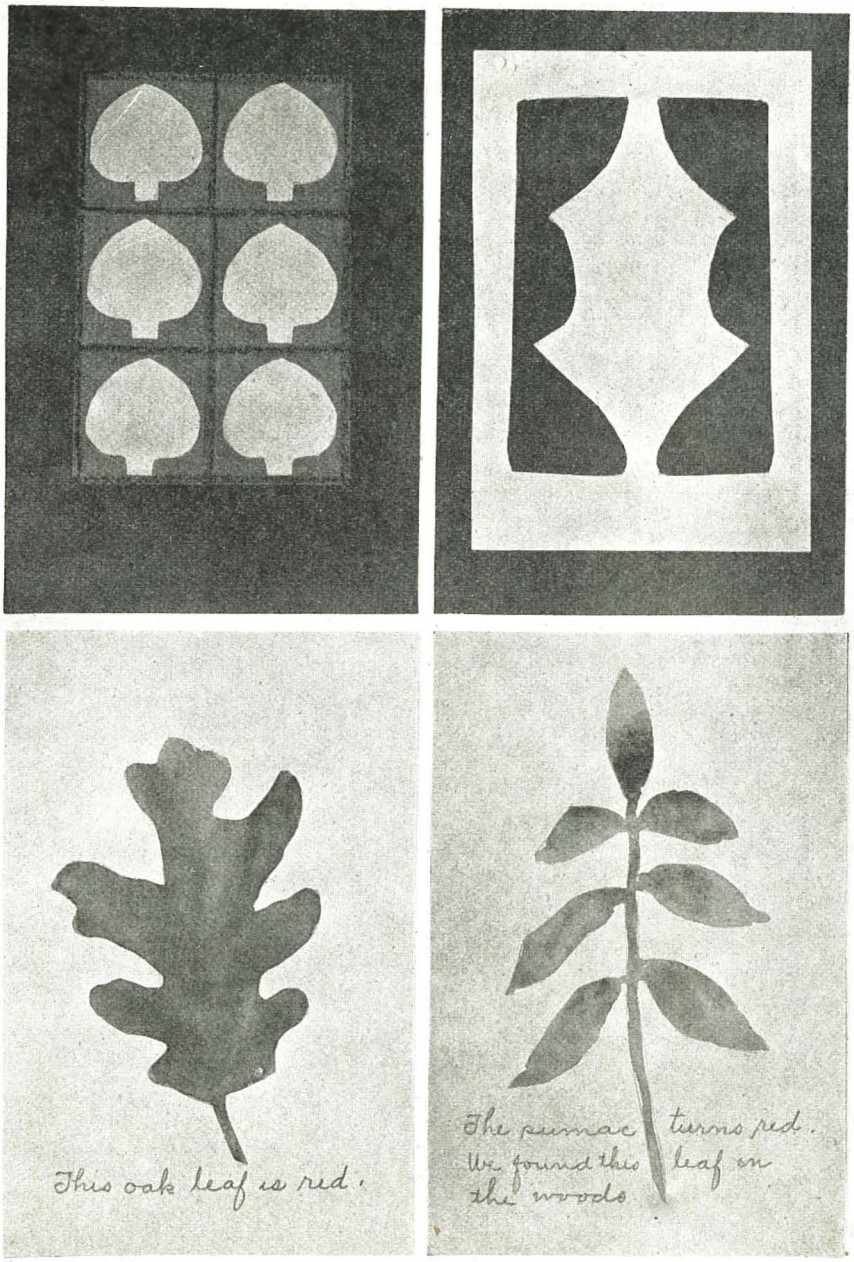


PLATE XLIII.
Top Row—Figs. 1 and 2. Bottom Row—Figs. 3 and 4.

Suggested Books.

Plate XLII illustrates covers of landscape books made by first-grade children. This book may be made in any grade. Refer to section on landscape for suggestions as to what may be used as illustrative material.

Figs. 1 and 2, Plate XLIII, show reproductions of the work of second-grade children. The illustrations represent covers of leaf books. The designs on these were done in crayon. The children chose the leaf as the motif because of its appropriateness. Figs. 3 and 4, Plate XLIII, illustrate what such a book may contain. The leaves are collected by the children, traced and colored and then cut out and mounted as shown here. Thru this experience, children become familiar with the shapes of different leaves and also with their colors. An effort is made to have the book show the change of color which comes in the various leaves. In these books the simple sentences based on the leaves are written on the pages of the book.

Figs. 1 and 2, Plate XLIV, show reproductions of covers for Nature Study books, made by third-

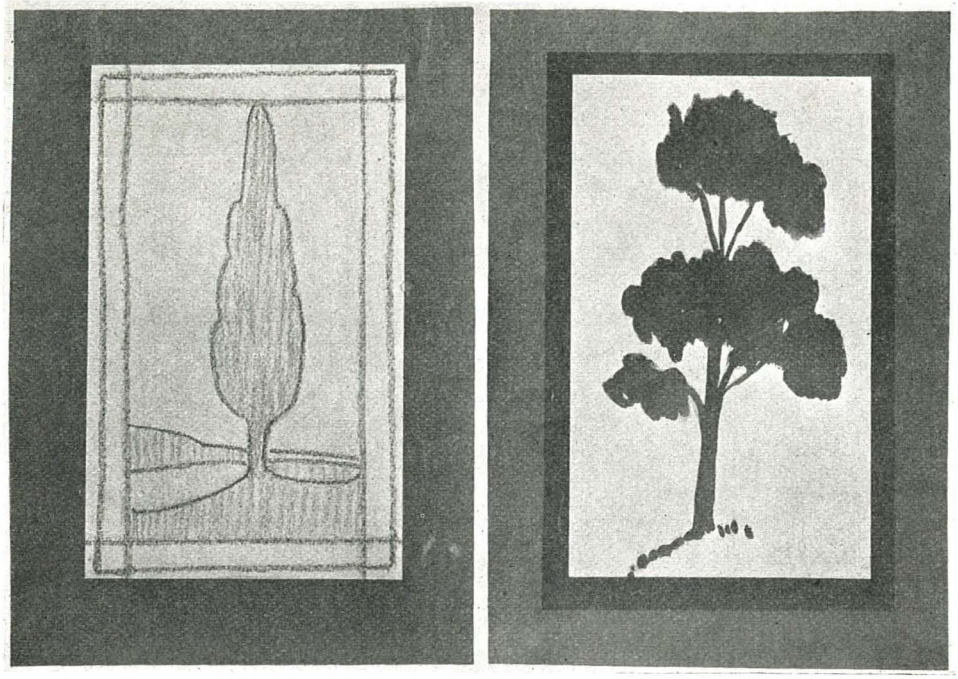


PLATE XLV.

grade children. This book is used as a mounting book for drawing and writing papers made in connection with Nature Study. The designs were done in crayons, the lettering in pencil. Figs. 3 and 4, Plate XLIV, show pages from one of these books reproduced.

Plate XLV suggests work for a tree book.

Such books as these suggested here, upon completion, will be a source of much pleasure to the makers. They will also give parents a better idea of the scope of the work their children are doing during part of the school time. But best of all, the making and keeping up of the various books will have a wonderful effect on the mental development of the children, and this should be the final test of all our work.

The Girl and Her Wage Earning Vocation

Edna Bryner, Author of Reports on the Garment Trades and Dressmaking and Millinery, Cleveland Education Survey

DURING an educational survey conducted recently in a moderate-sized American city, all the 13-year-old girls in the public schools were asked what they intended to do when they left school. At the same time information was gathered as to the kinds of work engaged in by their sisters who were under 21 years of age. The occupations in which the sisters were employed obviously represented the vocational fields which these young girls must enter when they left school. One-half of the 13-year-old girls said they expected to be either stenographers or school teachers; while only one-tenth of the sisters were engaged in these two vocations. Less than one-twentieth of the school girls expected to be servants or factory workers; while actually two-fifths of the sisters were employed in these occupations.

In another moderate-sized city, 70 out of every 100 of the native-born white girls who were about to leave school, said they expected to be school teachers, nurses, or stenographers, occupations which together employed only 20 out of every 100 native-born white women workers in the city. On the other hand, less than one out of every 100 expected to do factory work, a type of work employing 17 out of every 100 native-born white women workers.

Similar results are found wherever studies are made respecting the relation of girls to their future wage-earning career. The same studies made with respect to school boys show a much higher degree of correlation between the proportions of boys choosing the occupations afforded by the community, and the proportions of working men engaging in these respective occupations. Girls are evidently much less acquainted than boys with the work which the community demands of them. They are not sufficiently acquainted with the ordinary kinds of work, those which offer the greatest amount of employment; they do not know what the different kinds of work are, how they are carried on, or the amount of training required for entrance to them.

It is a good thing for all boys and girls to realize

early in life that certain kinds of work have to be done, and that the largest part of the work of the world consists of ordinary tasks. In building a house, nails must be driven, bricks and mortar carried, and paint put on. In making clothing, seams must be sewed and buttons and hooks and eyes attached. No matter how much the mass of workers want to become experts or how much they do become experts, these things must be done. If all the men who had anything to do with building had the ability and the training of master builders, some of them would have to drive nails and carry brick. If all the workers employed in the making of clothing had the ability and training to perform the work of designers, some of them would have to sew up seams and attach buttons.

A realization of this sort does not stifle ambition, as some are inclined to believe. Rather than stifling ambition it gives a solid basis for real ambition. It tends to avoid a situation where seven-tenths of the prospective girl workers expect to engage in occupations which can be counted on to employ only two-tenths of them; and where only one-hundredth of them expect to engage in an occupation which, in all probability, will employ nearly one-fifth of them. Such a situation shows that a great number of girls must fall back into tasks for which they have no relish. In short, they are shoved into occupations instead of entering them. A situation of this sort is a protest against permitting girls to leave school without knowing the kinds of work in which they are most likely to receive employment, the conditions affecting such employment, and amount of training which will be necessary to fit them for such employment.

The girl, of course, is much more handicapped than the boy in choosing her vocation. For the boy there is available the experience of men accumulated for generations ready to be handed out to him when he needs it. For the girl there is available the experience of only one generation of women, women who went blindly to work at something with the hope that it would open up to them a line of work suited to their ability. There is available for the boy experience not only far-reaching in the past but far-reaching in the present. Round about him at any time he can see nine-tenths of his sex at work. His stock of experience is both deep and wide. The girl sees only one-fourth of her sex at work. Her stock is both shallow and narrow.

The importance of choosing a vocation wisely becomes increasingly apparent from the fact that the number of girls who go to work increases every year and that most of these girls later become housekeepers and child rearers and inevitably carry over into their domestic careers the results of their wage-earning experience. According to the census of 1910, two-fifths of all the girls in the country from 16 to 20 years of age are wage earners. In the cities the proportion is much larger. In the eight largest cities, from one-half to two-thirds of all the girls are at work, the average being about three-fifths. These figures, large as they are, do not show the number of girls who go to work but only those who were at work at a certain time, the time at which the census was taken. Many girls go to work after one census and stop before the next one is taken. Since the census is taken only every ten years, a girl may work from one to nine years and never be listed as a worker. A conservative estimate placed the number of girls who go to work in America between the ages of 16 and 20 at somewhere between one-half and three-quarters.

The 13-year-old girls now in school will soon be doing the same kinds of work performed by the girls from 16 to 20 years of age employed today in the wage-earning world. These two millions of young workers are distributed among hundreds of occupations. Seven-tenths of the two millions are engaged in seventeen occupations. Seven-tenths, then, of the crop of school girls who start to work are bound to engage in these seventeen occupations. These occupations, which form the entrance gates for the mass of women workers into the wage-earning world, are listed below with the number of girls they employ out of each 1,000 working between the ages of 16 and 20.

Servants	149
Farm laborers (home farm)	142
Stenographers	50
School teachers	43
Saleswomen	42
Factory sewers	40
Farm laborers (working out)	39
Cooks	29
Telephone operators	23
Clerks in stores	23
Bookkeepers	22
Laundresses (home)	22
General laborers	21
Clerks (except clerks in stores)	21
Dressmakers	18
Milliners	17
Waitresses	14
Total	715

These occupations present a wide variety of types of ordinary work. A girl thoroly acquainted with their characteristics will have a knowledge of the requirements of commercial occupations, domestic and personal service, agricultural work, skilled factory work, hand trades, and professional callings. She will know many of the ordinary tasks performed by wage-earning women. She will then be likely to start upon her wage-earning career with at least as

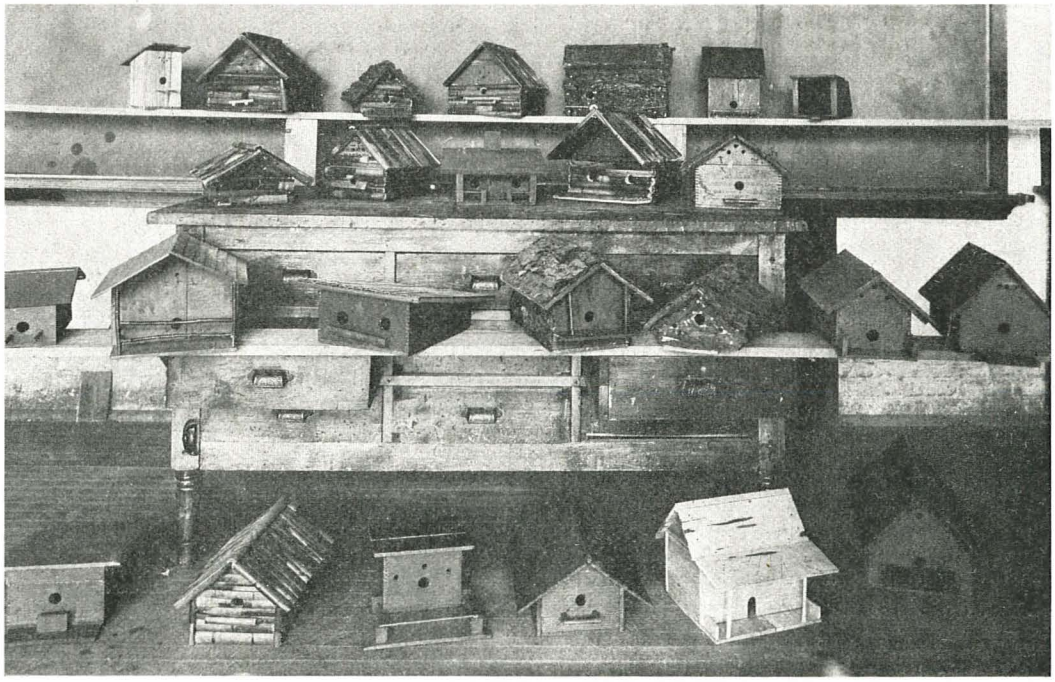
much idea of the limits and possibilities of her work as the boy has of his.

There seems to be a distinct tendency on the part of many interested persons to keep girls out of some of the occupations in which their sex is largely employed. It is a modern expression of the old desire to protect women and girls rather than let them protect themselves thru knowledge. This one wants to keep girls out of binderies; that one, out of millinery; another says no girl should be a machine operator. Meanwhile every year hundreds of girls are going into these occupations with no knowledge of the conditions under which they are to work and with no understanding of how to counteract the effects of fatiguing sedentary work.

There is also a tendency to find new occupations for girls and to turn the faces of all girls towards the new. Someone once remarked that she could not see that a new employment bureau which was formed ostensibly to direct girls into varied lines of work was any better than a former bureau. "The old one," said she, "made every girl who came to it into a school teacher. This one makes every applicant a stenographer."

Recently a young woman interested in establishing training courses for girls asked if there were not some new kind of work for girls to do. "Why," she asked, "couldn't a girl put panes of glass into a window as well as a man?" Well, she could. She probably does in some parts of the United States. But why should any special effort be made to direct girls into this trade. The wages are probably good for men; but there is no reason to suppose that they would be better for women than the wages in any of the better paid kinds of factory work. Surely there is nothing in the work itself that would make it a particularly desirable work for women. It offers no such variety of interest as dressmaking either in or out of the factory, or machine operating, for that matter; and it will never furnish a large field of employment. This case sets forth the curious attitude which many people take in respect to the vocational prospects of girls, an attitude compounded of a desire to obscure the drudgery of work by the effect of newness and an unwillingness to accept the fact that the biggest part of the work of the world is neither particularly pleasant nor vitally interesting.

Girls who are going to work need first of all information about the commonest kinds of work, those in which the largest numbers of women are engaged. They need to know what these occupations are, how big they are, what requirements they make in the way of training, what qualities and abilities they demand, and the conditions under which they are carried on. When a girl knows these things, she will have a fair notion of what she is fitted to do. If none of the large occupations seems desirable, she can search further in the field of vocational information. By this method of procedure the majority of girls will be in a position to choose vocations rather than having vocations thrust upon them.



BIRDHOUSES MADE IN THE SHOPS OF MR. GILMAN LANE, KALAMAZOO, MICH.

(See page 216.)

TEACHING BOYS TO SET BUSINESS CARDS

Edward T. Welsh, Instructor in Typography, Elm Vocational School, Buffalo, N. Y.

BEFORE beginning the actual setting of a business card, or any other piece of work that is undertaken in a school, much preliminary instruction should be given the boys so that they have a thoro understanding of what constitutes a good piece of printing.

Samples of good and bad specimens of printing will furnish excellent material for discussion and criticism. This may be gathered by the boys or may be prepared in the school for use in classwork.

Before work was begun on the accompanying business card the boys were taught the elements that enter into the composition of a pleasing job: balance, proportion, harmony, margins, appropriateness, etc. After this was mastered it was necessary to teach what lines should be displayed, and to what extent each should receive prominence. This was accomplished by taking the important lines in this order: Who, What, and Where. Who, being the name of the firm; What, the goods handled; and Where, the location of the store.

With these three words as guides the boys have a definite idea of the lines to be displayed, and in what degree each should be given prominence. All other matter on the card is secondary to these three lines and can be arranged to suit the taste of each individual.

A booklet, which has been prepared in the school, containing a number of poorly set business cards, with criticisms showing the weak points, as well as a re-set of each of the cards, is next brought into use, and from this the boys are able to see the difference between a job poorly handled and the same job correctly handled. By reading the criticisms accompanying each card the boys are enabled to understand why the card is wrong, and when they compare the re-set with the original they see what changes were necessary to make it right.

Headquarters for Sporting Goods of all Kinds.
Agent for the Indian Motor Cycle.
Oil and Gasoline for Autos.

Thomas W. Blackburn,

Bicycle Builder.

We handle all the leading makes of Bicycles.

139 Haywood Ave. *Indianapolis, Ind*

ORIGINAL
The Card as the Boys Received it.

CRITICISM FOR BLACKBURN CARD.
By Leland Hirsch, Age 14.

There are too many different faces of type, and they do not harmonize properly; there is an absence of simplicity in this card; the various lines should be grouped into fewer forces of attraction; the punctuation marks at the end of display lines should be omitted, except where abbreviations are used; the margin has been poorly handled; the elements Who, What, and Where have not been treated properly.

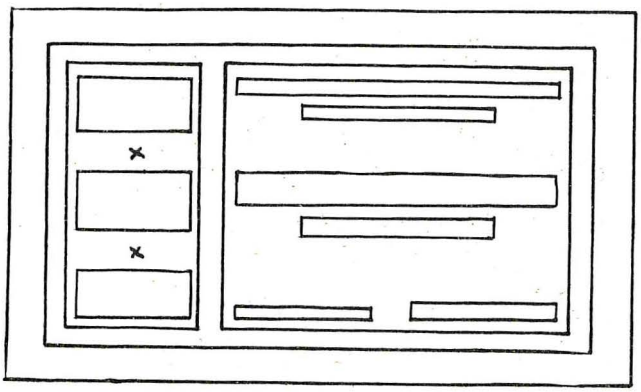
CRITICISM FOR BLACKBURN CARD.
By Frank DeSio, Age 15.

There are too many different type faces used; there is a lack of harmony in the card; punctuation marks are not needed at the end of display lines, except when words are abbreviated; the elements Who, What, and Where have been improperly treated.

The next step is making the preliminary sketches. A booklet containing a number of different kinds of jobs with preliminary sketches for each is now introduced and the boys see what preliminary sketches are, and how they help the printer in the setting of a job, and when they are called upon to make a sketch they know how to begin.

The class is now ready to take up the composition of business cards.

The original which appears in this article was handed to the class with the instruction to criticize it, make a preliminary sketch, and re-set it. As an incentive the class was informed that the two best cards would be reproduced in the school paper.



Preliminary Sketch and Reset by Frank De Sio, a Second-year Student at the Elm Vocational School, Buffalo, N. Y.

OIL AND GASOLINE FOR AUTOS

❖

WE HANDLE ALL THE LEADING MAKES OF BICYCLES

❖

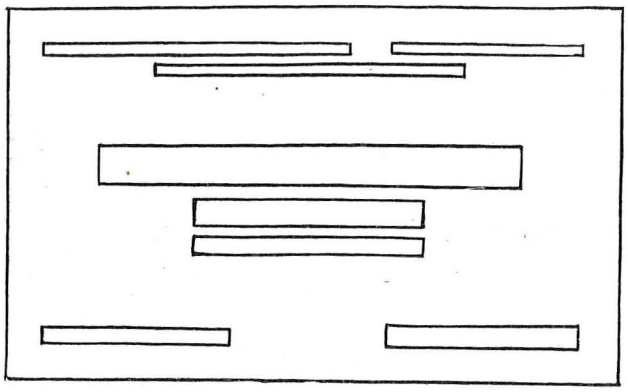
AGENT FOR THE INDIAN MOTOR CYCLE

HEADQUARTERS FOR SPORTING GOODS OF ALL KINDS

THOMAS W. BLACKBURN
BICYCLE BUILDER

139 Haywood Ave Indianapolis, Ind.

The Card as Reset.



Preliminary Sketch and Reset by Leland Hirsch, a Second-year Pupil at the Elm Vocational School, Buffalo, N. Y.

A Reset Card.

The cards shown on this page were selected by vote of the class to appear in the Ben Franklinite, the school paper, and are here shown exactly as they came from the hands of the boys.

ELECTRIC COOKER

L. C. Petersen, Director of Manual Arts, State Normal University, Carbondale, Ill.

THE high school boys in our training school have been much interested in making this cooker, and it has afforded them an opportunity for experience in working different materials.

The cooker is an effective household convenience and can be operated by connecting it to an ordinary lamp socket. Four different intensities of heat can be secured by simply slipping the socket on in a different position. This is a great advantage over those now on the market and makes it suited to a greater variety of uses as a household cooker, a heater for the chemist and doctor, a glue heater, "running" an incubator, etc.

The heating elements consist of two pieces Chromel "C" wire, or Nichrome wire. The large coil of No. 22, the small coil of No. 26, or, if more heat is desired, use No. 20 and No. 24. To find the proper length, wind the wire around a piece of slate or a drain-tile, keeping the turns apart, and connect one of the terminals of a drop-cord to the end of the wire. Take the other terminal and apply it at a point on the wire about thirty feet from the end and move it toward the end till the wire becomes cherry red.

Cut off the wire and wind it into a tight coil around a 3-16″ rod. As the cooker may be made either square or round the transite wood should be shaped accordingly. It can be worked like hard wood on bench or lathe and may be purchased from H. W. Johns-Manville Co.

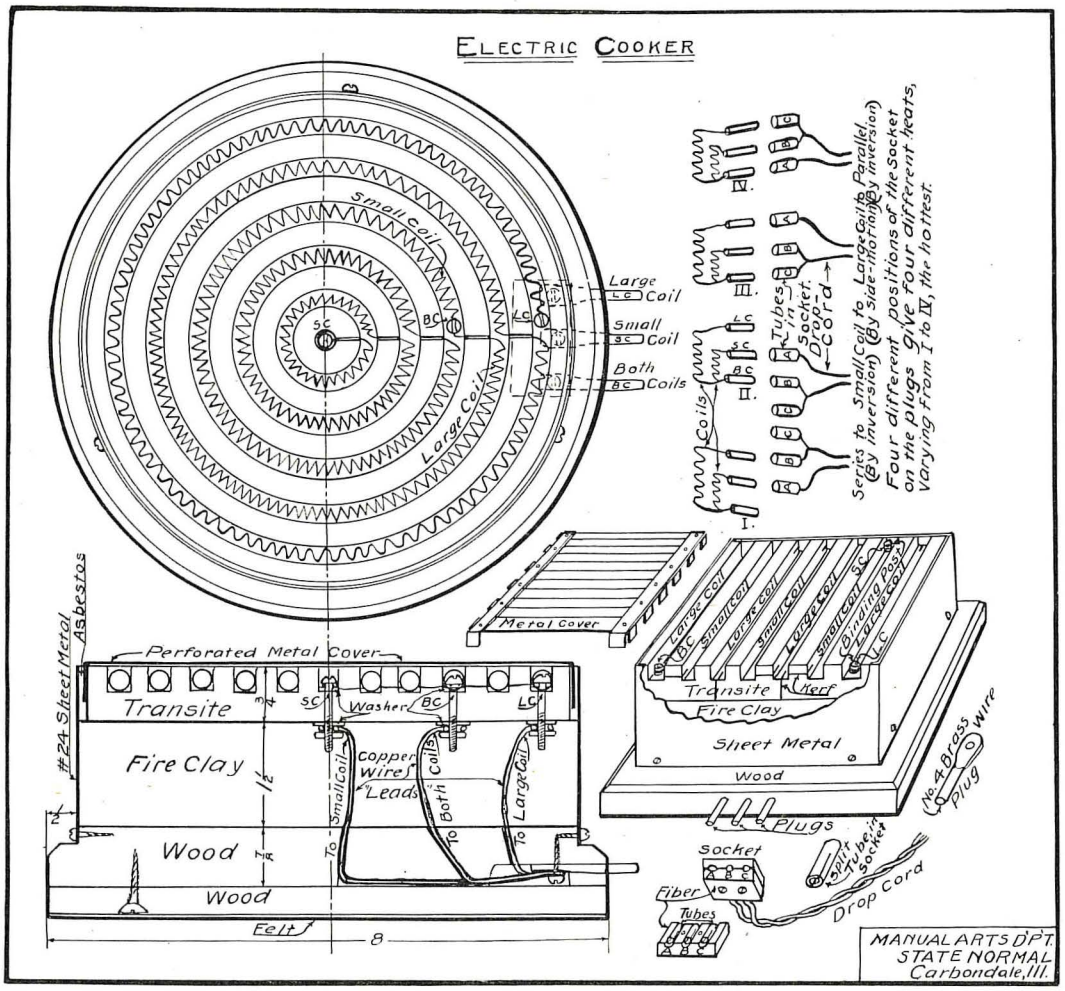
Plane seven grooves in the square transite and turn five, circular, in the round, deep enough so the coil when placed there will not reach to the surface. The coils are lodged in alternate grooves, the large one in four, the small in three grooves in the square, while in the round transite, the large coil is lodged in

COOKERS MADE IN MR. PETERSEN'S CLASSES.

the two outer grooves and the small coil in the three inner ones. Each coil is stretched to the proper length to fill, exactly, the grooves assigned. Where the coil passes from one groove to another, a straight place is made on the wire and kerfs are made in the transite with a backsaw in which to lodge these straight places between the coil sections.

In the accompanying drawing, the binding posts are marked BC, where both coils have ends fastened, the base and in line with the upper part of this cavity. The plugs, with the inner ends hammered flat and holes drilled, are then pushed from the inner cavity out thru the three holes and the flat ends fastened with round-headed wood screws, which serve also as binding posts for the wires that connect the plugs and the lower ends of the posts, thru the transite.

After the metal enclosure has been fastened to the base, knead the fire clay to a dough, cover the top



DETAILS OF THE COOKER.

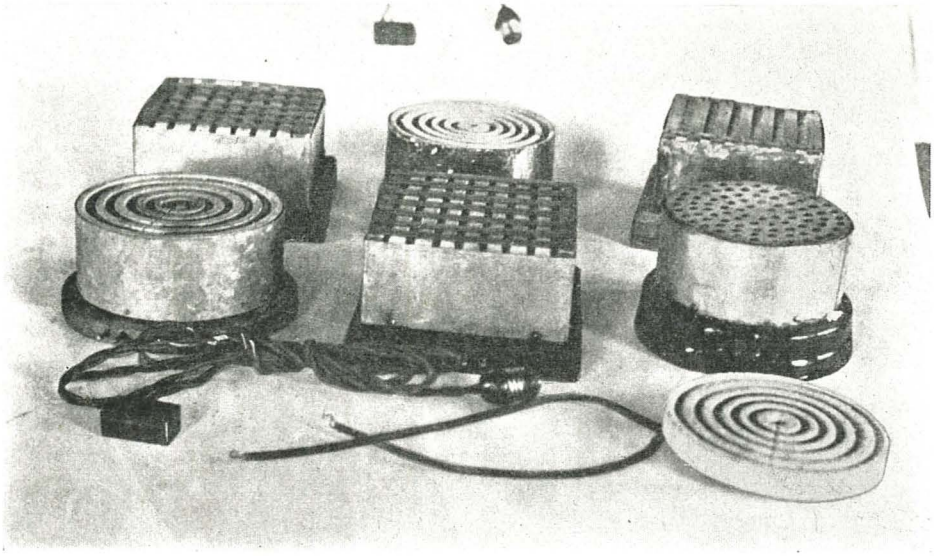
SC, where the other end of the small coil is fastened, and LC, where the other end of the large coil is fastened.

A piece of sheet brass $2\frac{5}{8}''$ wide and long enough to enclose the transite and leave $\frac{1}{8}''$ space for asbestos to insulate the transite from the sheet metal all around. The heat is thus concentrated at the top of the cooker and the base remains cool. The ends of the metal are riveted together.

The wooden base is turned up so that a $\frac{3}{8}''$ projection fits up inside the round metal enclosure, to which the latter is fastened with screws. A rectangular cavity $1\frac{1}{4}''$x$1\frac{1}{2}''$ is cut into the bottom of the base, $\frac{3}{8}''$ deep, $\frac{5}{8}''$ from the outer edge, and three holes, $\frac{5}{8}''$ on centers, are bored from the front edge of of the base with layers of paper and fill in with clay to within $\frac{5}{8}''$ of the top edge. Press down level and let dry. Bore three holes thru clay and wood base to correspond with the position of the binding posts in the transite. The binding post may be a slender brass machine screw, two washers and a nut.

Put coils in place. Fasten copper "leads" to lower ends of binding posts, and insert thru clay and base, lodge them in grooves cut along under side of base and connect to the plugs. Fasten with screws the sub-base, cover bottom with felt, stain and shellac the base.

The top cover may be of metal strips, riveted together or of sheet metal with large perforations. It



COOKERS MADE BY MR. PETERSEN'S STUDENTS.

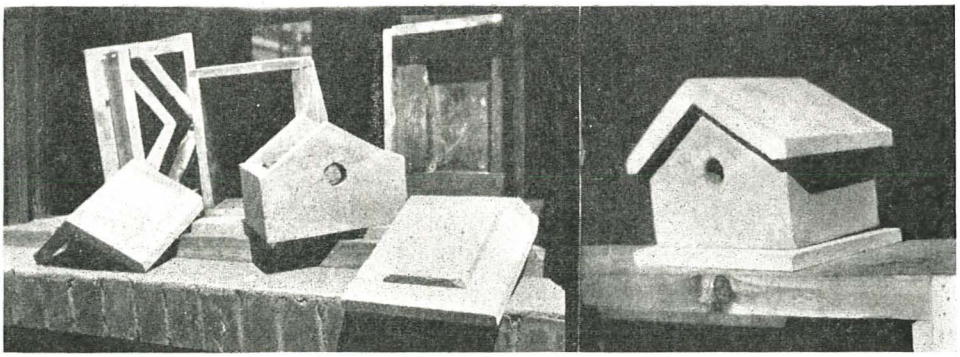
is bent down at the outer edges to fit close to the transite.

The socket consists of two pieces of fiber $\frac{3}{8}''$x1''x 2'' which are fastened together with two wood screws. Three holes are bored along the joint for the three pieces of brass tubing that fit onto the plugs. Each tube is $\frac{3}{4}''$ long and is split by a saw-cut for a half-inch.

The drop cord is soldered to the tubes, one terminal to two tubes and the other to one. Each tube is drilled transversely and pinned to the fiber. Attach a common screw-plug to the other end of the drop cord and the cooker is ready for use.

The way to make the different connections is shown on the drawing by diagrams I, II, III and IV. In "I" the lowest heat, the coils are in series and cost about one cent per hour. In "II"the socket is turned upside down and the small coil only is heated, at two cents per hour. In "III" the socket is moved to the right onto all three plugs and heats the large coil only at four cents per hour. In "IV" the socket is turned downside up and heats the two coils in parallel, costing six cents per hour.

This kind of electric cooker is absolutely reliable as there are no switches to corrode and get loose.



Concrete Bird House and Molds used in making it, designed and made by L. A. Gordon in Summer School of Washington State College, Pullman, Wash.

An Analysis of a Course in Interior Electric Wiring

Gerald A. Boate, Newtonville, Mass.

BY referring to Chart No. IV, which shows the hours per year devoted to the related and academic subjects of the course designed for the interior electrical wiremen, I will attempt in as few words as possible to show the type or kind of work which each bar represents.

English: Similar to that offered to students of patternmaking, except that oral and written themes, letter writing and reports center around the electrical industry, shop orders, equipment specifications, etc.

History and Civics: The aim of this work is to train primarily for citizenship. The boys are made to appreciate the city's government, especially the departments of fire, health, and police. Especial attention is given to street, forestry, school, and assessing departments to see the necessity and develop the willingness on the part of the boys to co-operate with such experts in the accomplishment of their tasks.

The work in the second year is based on current events. Every intelligent citizen should have a comprehensive understanding of contemporary and local events. This can only be obtained by a careful study of cause and effect.

The aim of the work in the third year is to enrich the vocational intelligence and ideas of the boy and lead him to not only become a more intelligent citizen, but a better tradesman thru the studies of such industries as: Iron and Steel; Development of the Electrical Industry; Lumber; Cotton; and Natural Resources, such as Water Power effects of irrigation and reclamation of waste lands, etc.

In the fourth year the boys have reached a greater maturity, and are capable of better reasoning and more advanced thought on such subjects as: Suffrage; Referendum and Recall; Commission Government; Popular Election of United States Senators; The Philippine Question; The World's War, etc.

Thru all this work the history of the past is interwoven with that of the present. For example, the cotton industry deals with Europe and India as well as America, the customs and development of the people and process of manufacture in the various countries mentioned.

Mathematics:

First Year: Figuring time and cost from shop job cards; general review of fractions; board measure; problems of $I=\frac{E}{R}$ for one wire and wires in parallel; strength of current in divided circuits, in series; circular and square mile areas; calculating size and resistances of current carrying wires; general problems from vocational arithmetic.

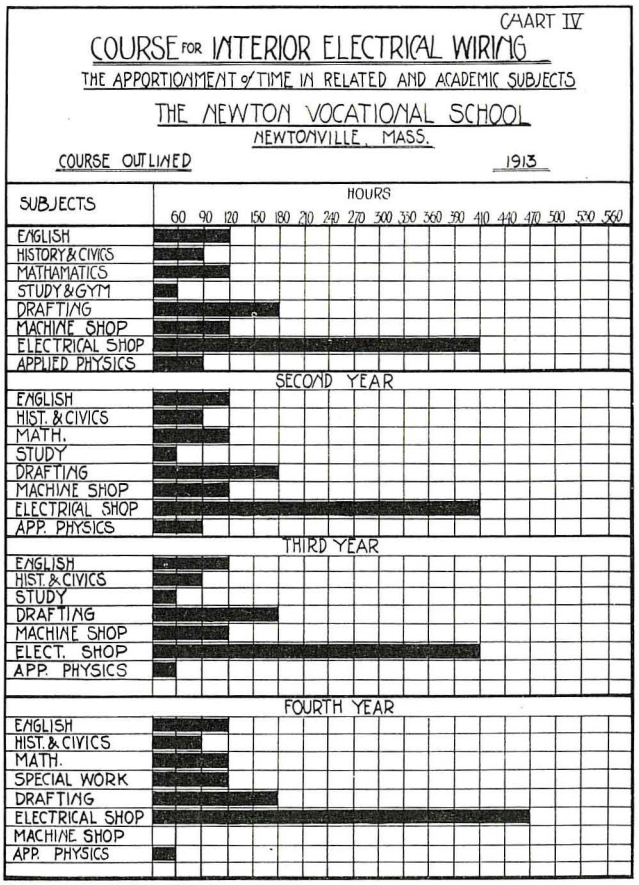


Chart IV.

Second Year: Figuring complex electrical circuits from Ohm's Law; layout work in constructional geometry; formulae and calculations relative to speeds, etc., of motors, shafting and driven machines; calculating amount and size of wire for certain jobs; more advanced problems connected with shop practice.

In the third and fourth years the boys become familiar with elementary trigonometry, logarithms, slide rule, and are given work in direct and alternating currents, estimating from specifications of contracts, etc. Thruout all the years students build up their own reference books. Much material is furnished them by the drafting and shop departments, which is multigraphed or blueprinted.

Drafting:

In the first year emphasis is placed on neat freehand sketching of wiring diagrams, projections and details of simple electrical apparatus; as binding posts, switches, receptacles, etc., assembling, isometric sketching and wiring symbols.

Second Year: Use of instruments, projections of more complex electrical apparatus, detailing, assembling, tracing and blueprinting for shop use.

Third Year: Wiring layouts, switch-boards, distribution, isometric details, house wiring plans and details, developments and cabinet drawing.

In the third and fourth years, the work becomes more specialized and consists of the duplication of electrical machinery and devices, also design of special equipment and machinery.

Machine Shop:

The machineshop work is really divided into three different kinds of shop work: machineshop, carpentry, and forging. In the machineshop instruction is given in the use and care of lathe, drill press, shaper, planer, and bench work, and consists of making a few tools which the electrician will need, turning shafting and armature commutators, key seating, etc.

In the carpenter shop they are taught the care and use of the common hand tools of the carpenter's trade, which an electrician will be called upon to use in his work. Mitering and fitting joints for wooden mouldings, elementary study of house construction, cutting into walls of various materials for receptacles, flush switches, supports for fixtures, and meter boards, cut-out boxes, etc.

Forging for electrical students consists of the study of the properties of iron and steel, tempering, welding, annealing, and forging of pipe hangers, brackets and braces for switch boards, making drills and chisels, etc. The aim is to make the boy sufficiently dexterous with the smith's tools so that he can take care of himself in an emergency.

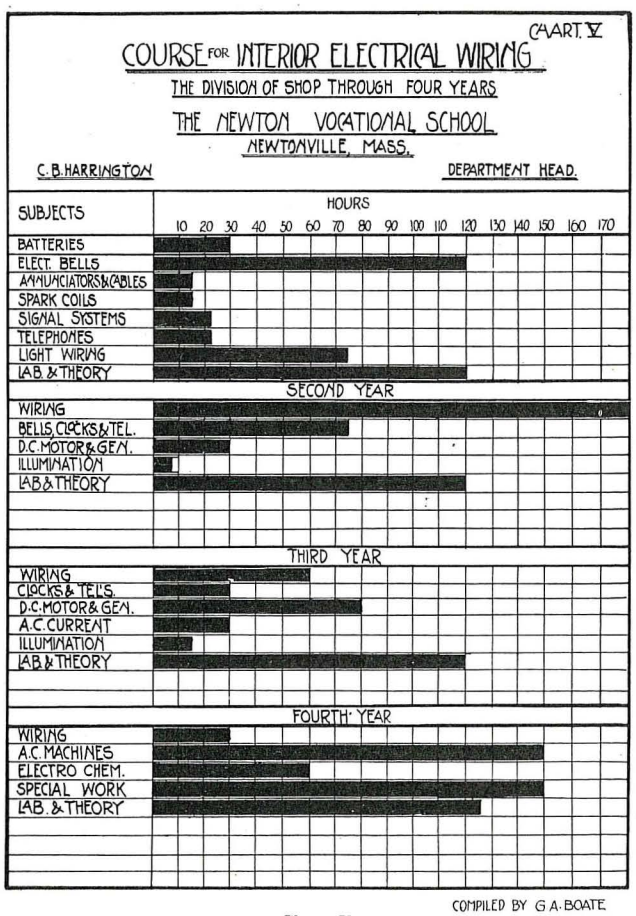


Chart V.

Applied Physics:

Special emphasis is placed on the following: Elementary mechanics; application of simple machine principles; heat and its application to a wide variety of shop operations and devices; properties of metals, tests; sanitation, proper shop conditions as to light, heat, air, and water supply; care of body, first aid to the injured, disinfectants.

Elementary Electricity:

Second Year: Mechanics (continued).

Electricity and magnetism, theory and tests correlated with shop practice; advanced work in heat, study of heating devices, efficiency tests, power consumption and cost of operating power machinery; elementary illumination, embracing laws and theory; measurement of candle power, calculation of foot-candles, etc.

Third and Fourth Years: Advanced theory and tests correlated with shop practice. Illumination—Tests for alternating current machines, rotary converters, rectifiers, etc. Experiments dealing with inductance, lag lead, power-factor, polyphase current, etc.

Electro chemistry; study of the chemistry of primary and secondary storage cells; electro plating, electrolytic rectifiers and a brief treatment of electricity in electro chemistry.

Electrical Shop. See Chart No. V.

This chart shows the differentiation of the major subject and needs little explanation, other than the collecting of groups or division of subjects which might show more clearly the fullness of the course.

In the first year the work is as follows: Study of primary batteries, construction, repair and use, bells, circuits, installation and repairs, annunciators, signals, alarms and thermostats; ignition by battery and magneto, gas lighting, storage batteries, construction, care and operation, special woodwork under laboratory.

Preliminary training and practice work are done on as large a scale as possible, and with the same care as tho it were a permanent job. This work is also done in correct position, i. e., if wall wiring, it is done on a wall; if ceiling work, it must be done overhead, not on floor boards. The work is considered complete when measured by Underwriter's Standards and trade requirements.

Second Year. Elementary light and power wiring; open wiring, cleats, knobs, cut-outs, switches, receptacles, etc., mouldings, metal and wood with fittings—Rigid and flexible conduit with fittings—Concealed wiring, finish work, BX and Loom—Elementary fixture wiring and connections—"Underwriter's Rules" special requirements and catalog material lists. Elementary direct current motor

connections—Care of stock room—Special machine-shop work.

In the second year the shopwork is largely productive; when practice work is deemed necessary it will be carried on as described in the first year.

Third Year: Advanced light and power wiring, practice as foremen on jobs included in first and second years. "Underwriter's Rules" and special

Fourth Year: Advanced power and light wiring, practice on jobs included in first, second and third years, voltage regulation, booster steps, etc., high potential transmission, advanced motor and generator work, advanced direct current motor and generator work, alternating current generators, selection, operation, repairs and tests, transformers, various types and uses, rotary convertor, mercury arc and

MASTER TRADE RECORD SHEET OF THE INTERIOR ELECTRICAL WIRING DEPT. NEWTON VOCATIONAL SCHOOL NEWTONVILLE MASS. CHART VI

SUBJECT			McGRADY A.	HAMMELL H.	NELLIGAN T.	HAYNE R.	LYONS J.	GOODMAN N.	FERGUSON A.	EGEL G.	BLACK R.	BRYSON J.	DEXTER R.	BENNETT	BOYD R.	ANZUINO D.	DOOLEY J.	GLEASON H.	FLYNN G.	HARDESON	HEAD H.	HEALEY P.	HOLT JAS.	KING E.	LEHMAN E.	PARKER F.	TRUAX H.	VINCENT A.	GULLIVER A.	L'E. CROIX A.
BELL WORK	1	BOARD WORK																											
	2	REPAIR	15		25		30	40	31	19	17	43	17	28	40	55	55	20	60	40	35	85	25	45	80	60	15	45	25	50
	3	OPEN	36	35	20	40	60	30							15	30	60	40	30	65	55	35	10	60	40	90	50	80		25
	4	CONCEALED	20	70	17			80				15		40					50											
LIGHTING	1	BOARD WORK	16	19		45	72	28							90		60	150	160	40		100	95	50				65	70	
	2	REPAIR	45	50	35	50	60	60	40		40	240		60	20	90	60	65		60	90	40	20	75	80	60	30	40	135	85
	3	EXPOSED	100	65	100	90	80	85	70	100	20				35	100	55	40	45	20	85	50	10	80	20	85	100			90
	4	CONCEAL	65		65	25	70		35		20	60		95	40		25		15				35				30		100	
POWER	1	EXPOSED	50	25	35	70		55	45	40		75	65	65	10	55	40	45	25	50	60	85		65	20	80	90	40	15	20
	2	CONCEAL	25	40	30	60	70	30	19	28	42	50		70	40	19											35		25	
	3	CONNECT	30	10	25	30		45	25		70	35	40	60	15	30	20	65	10	30	30	15			30	15			35	
MOTOR D.C.	1	ASSEMBL	45	15	25	50	40			55			55				10		19	28		40		20			30			
	2	DISSEMBL	35				25		30		45		30																	
	3	TESTING		45	20	35	30	30		30	30	35																		
MOTOR A.C.	1	ASSEMBL																												
	2	DISSEMBL																												
	3	TESTING																												
MOTOR POLY.	1	ASSEMBL.																												
	2	DISSEMBL																												
	3	TESTING																												
ARMATURE WORK	1	WINDING																												
	2	COM. WORK										50	80																	
	3	REPR. WORK																												
CONSTRUCTION	1	DYNAMO											20																	
	2	MOTOR									40																			
	3	SW. BOARD																												
MAINTAIN. WORK	1	BELLS	35	30	50	45	30	30	35	60	70	28		55	10	70	30	40	15	55	35	30	15	10	90	20	15	30	20	25
	2	LIGHTS	50	25	30	20	45	40		40	40					35	45	15	20	80	45	20	15	10	60	15	20	40	15	
	3	POWER		10			15			20	35	7	55	15	70	60	30													
	4	MOTOR			10	15		10		40		16	42	35	28							60								
	5	ASSEMB.		45								70																		
	6	LAYOUT WK.		80																										
SW. BD.	1	REPAIRS	60		15		50	25	40						50														70	
	2	ASSEMB.					20	65	20					100																
BATTERIES	1	CARE																												
	2	STORAGE									100																			
STOCK ROOM			40	28	30	15	26	30	41	35	24	13	60	40	31	29	20	16	43	17	23	41	17	29	43	53	39	27	46	53
EQUPT. REPS			28	17	21	37	19	40	25	17	37	21	29	43	32	35	34	60	37	51	43	20	31		60	40		29	37	46
INSTALL.	1	D.C									75		45																	
	2	A.C.																												
	3																													

Chart VI. A Record of the Trade Training received by a group of boys in the Newton Vocational School.

requirements, direct current motors, proper selection, care installation and repairs. Switch boards, construction, wiring, power distribution—Elementary transformer work. (Low voltage)—Direct current generators, study of operation and tests, estimates on wiring and lighting from blueprint plans of houses and small factories, specifications, inspection, three-wire systems.

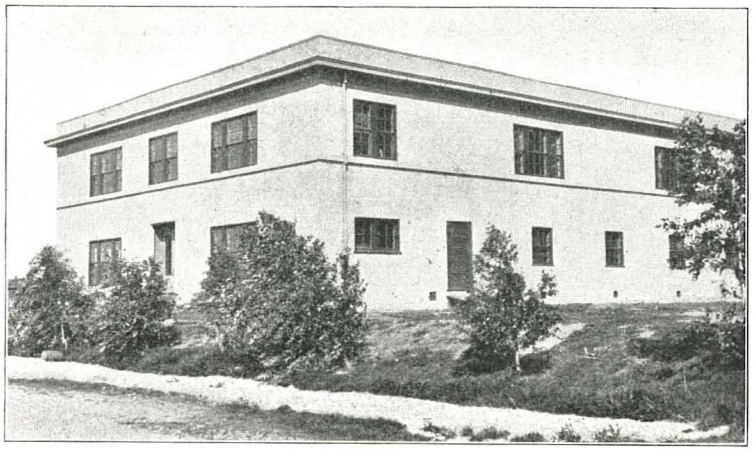
electrolytic rectifiers. During the last half of the fourth year, students who have secured a position or have decided upon a definite line of work may specialize in any of the above to prepare for that position.

The men who teach the related mathematics, drawing and science are electrical engineers by training who have had considerable shop experience.

The shop instructors are technically trained practical electricians who have had several years of shop experience, and have been in charge of jobs on which from ten to forty men were employed, hence they know both the executive and practical end of the business. The boys of the interior electrical wiring course are given the practical experience under the direct supervision of their instructors, Mr. Pitt and Mr. Lowe, by taking care of the electric lights, bells and gongs, motors, etc., of 22 grammar schools, and the two high schools of the city's school system. In the Technical High School, part of which accommodates the Vocational School, there are sixty generators and motors, two inter-communicating telephone systems, forty electrical clocks, and nearly all forms of lighting. The care and, to a great extent, the installation of this is in the hands of the boys. The electrical shop contains a small two-story wooden building, built according to the "Newton Building Code." This house is wired for electric lights, annunciators, gas lighting system, door bells, burglar alarms, and numerous other devices, as part of the shopwork.

Chart No. VI shows a record of trade training for the second-year group of boys. Individual record trade cards are kept for each boy, the hours of training being posted from weekly time cards. The trade record cards are $8\frac{1}{2}$x11 inches and a duplicate of Chart VI, except that where this chart shows the name of each boy in the class, the trade record card shows only the name of the student, there being as many cards as there are students. Hours of training are entered horizontally, every ten hours being represented by the letter X.

Employers desiring the services of boys for summer employment have access to these records, and a number of our boys have found profitable employment during the summer vacations, between the second and third, and third and fourth years.



GYMNASIUM BUILDING, RED BLUFF, CAL.

The gymnasium building illustrated above stands as a monument to the efficiency of the Manual Training Department of the Red Bluff Union High School. The plans for the building were drawn by Mr. E. E. Biddall, head of the department, and the entire work from the first survey for the location of the building to the last touch of the interior painting was done by the students of the department. The building was planned in the summer of 1916, and the work of construction was begun in August. It was conducted thruout the school year and was completed about March 15. The building contains, in addition to a large gymnasium, a number of small rooms for work shops, etc.

The Red Bluff Manual Training Department was recently surveyed by Dr. W. Scott Thomas of the University of California. In his report on the department Dr. Thomas recently wrote:

"As to the manual training department the work is so effective, so practical and sensible that I shall take the occasion to advertise it thruout the state as approaching my idea of the sort of work that the manual training departments of the high schools of California ought to be doing."

PRIMARY CONSTRUCTION

Edward F. Worst, Director of Elementary Manual Training and Construction Work, Chicago

MAY AND JUNE.

Construction Work for First Grade.

This is the last of the series of articles on primary construction work. The fact that a few suggestions may seem a little out of season is due to the fact that each month has been so full that space and time did not permit their appearance in earlier issues of the magazine.

Cutting and Tearing.

This season of the year so abundantly furnishes suggestions for the cutting and tearing—jumping rope, playing with jack stones, playing with marbles, etc. The spring vacation has just closed and with it came numerous activities pursued by the children. Moving day is full of suggestions of cuttings.

Clay Modeling.

Any of the above named suggestions are equally suitable for the work in clay, which should precede the cutting.

Badges.

Badges similar to those constructed for Lincoln's and Washington's Birthdays may again be made for Memorial Day. For directions see February outline.

Flower Pot and Plant.

Purpose:

To interest the pupils in nature drawings and construction.

To afford opportunity in color combinations.

To give a basis for blackboard language and reading.

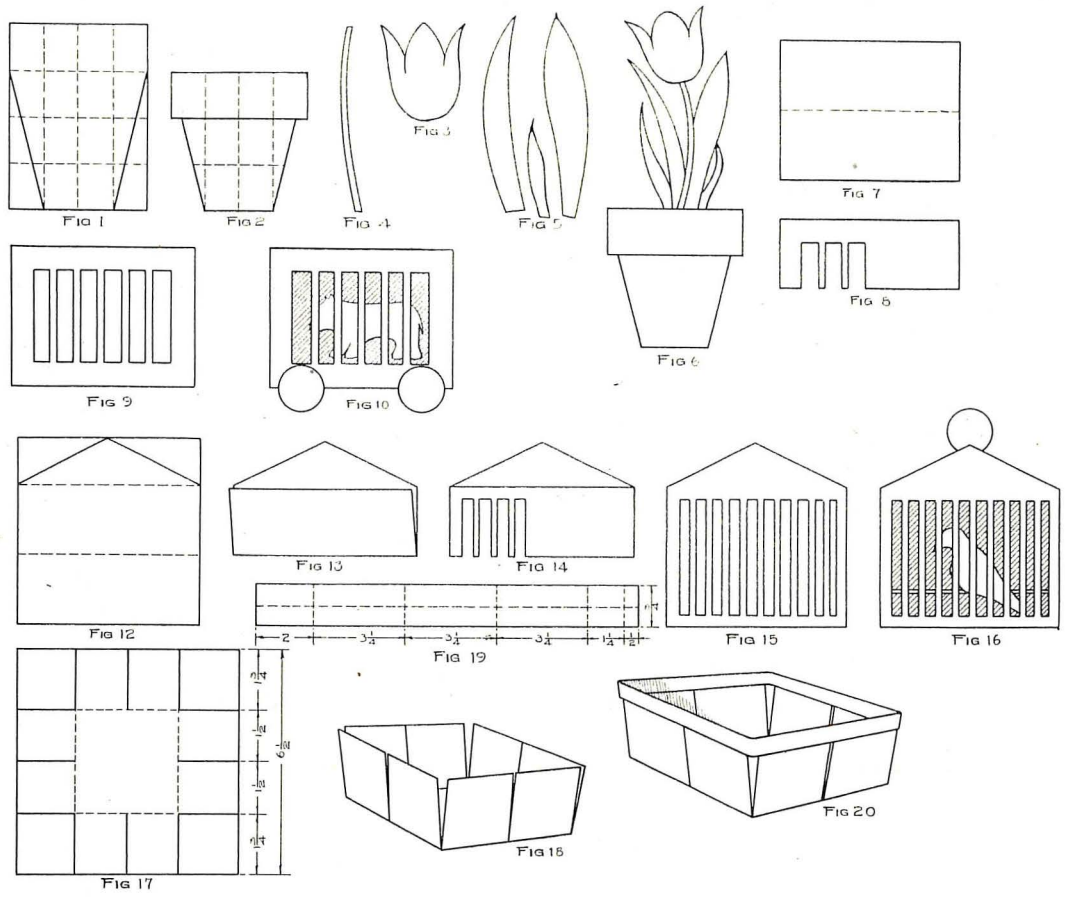
Material For the Room:

1 pk. of 6″x9″ construction paper.

Scraps of tinted construction and engine paper.

Presentation:

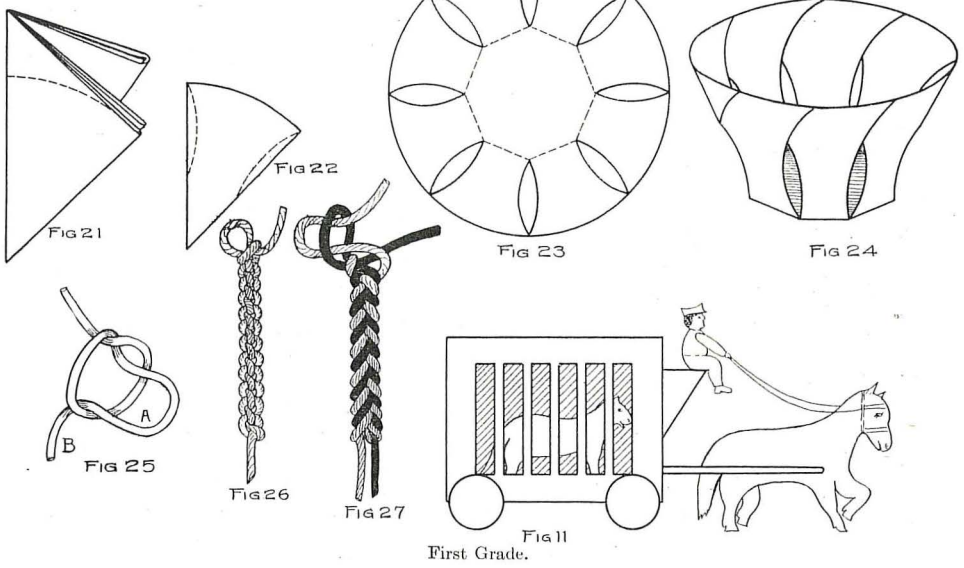
It is usually easy to interest pupils in nature forms. A potted plant in bloom in the schoolroom would add much to the interest and aid the pupils in the right forms of construction. Choose a simple form such as the tulip.



First Grade.

To Make the Flower Pot.

Fold a piece of 6″x9″ construction paper into halves lengthwise and cut on crease. Place the ruler along the long edges of one of the halves and place points, four inches from short edge. Connect points by a straight line and cut. Each pupil now has a rectangle 4″x3″.



First Grade.

A few practical questions on number may be asked at this time:

How long is the rectangle (oblong)?

How wide is the oblong?

How much longer is it than it is wide?

Draw a line equal in length to the two short edges put together.

Draw a line equal in length to the two long edges put together.

How many inches is it half way around the oblong?

How many inches all the way around the rectangle?

Fold the oblong just cut into sixteen equal parts, Fig. 1. Draw the continuous slanting lines, as shown in Fig. 1.

Review the number work as suggested in previous exercises.

Cut on the continuous slanting lines and fold the top row of oblongs over onto the remainder of the folding, Fig. 2.

To Cut the Flower.

From a piece of colored paper cut freehand the flower, as shown in Fig. 3.

Cut the stem of green paper, Fig. 4.

The Leaves.

From green construction paper have the pupils cut the leaves, as shown in Fig. 5.

Assembling the Parts.

Paste the flower pot to a 9″x12″ piece of construction paper about two inches from one of the short edges.

Assemble the parts, as shown in Fig. 6.

Group Problem—The Circus Parade.

There is no group problem so interesting to pupils of the lower grades as that of the Circus Parade.

The work in this connection should be made as simple as possible.

No attempt should be made to construct the cages in three dimensions. The pupils should be allowed to cut the cages from one piece of paper.

Cutting Animals.

Have the pupils cut freehand such animals as may have been seen at the park or the circus.

Cutting the Cage.

Pass to each pupil a piece of construction paper 4″x3″. Fold in center as indicated by dotted line, Fig. 7. Cut as shown in Fig. 8. Unfold and Fig. 9 is the result. Cut the wheels by using a milk bottle top for pattern.

Assembling the Parts.

On a piece of black or any other dark construction paper 4″x3″ paste the animal. Over the animal paste the cage and to the cage paste the wheels, as shown in Fig. 10. This may be enlarged upon by cutting horses and pasted so as to be drawing the cages. (Fig. 11.)

A driver might be cut and placed on the cage. Lead pencil lines may be drawn from the horses to the hands of the driver. (Fig. 11.)

The whole exercise is pasted to a 9″x12″ piece of manila drawing paper.

By stretching a piece of wall paper, figured side next to the board across the top of the blackboard, a most interesting circus parade may be mounted on it.

Bird Cage.

Fold a piece of 9″x12″ construction paper as indicated by the dotted lines in Fig. 12. Fold double as shown in Fig. 13, and cut as shown in Fig. 14. Unfold and Fig. 15 is the result. Cut freehand, birds. Paste the bird on to the window pane and then the cut cage over the bird. Fig. 16 is the result.

Berry Basket or Box.

This is the season for the early small fruits so the pupils naturally are interested in the berry basket or box.

Fig. 17 shows the drawing for the box.

For the children the box may be made of a 5, 6, 7, or 8-inch square, folded into sixteen small squares and cut as shown by the continuous lines in Fig. 17. Fig. 18 shows the box cut and sides turned upward.

Fig. 19 shows the band for encircling the top. It is folded lengthwise thru the center, one-half

placed on the inside of the basket and one-half on the outside around the top edge. A single strip cut freehand may be used instead of the double strip.

Another Berry Basket.

Have the pupils fold an eight-inch square first into halves, then quarters, and finally into lengths by folding the diagonal as shown in Fig. 21. Cut a circle by following the dotted lines. (Fig. 21.) Cut along the dotted curved lines at each side as shown in Fig. 22. Unfold and Fig. 23 is the result. Turn each division upward leaving a circular bottom with a diameter of two or three inches. Allow the different parts to overlap and paste. Cut a strip about one inch wide and long enough to reach around the top of the basket. Fold the strip into halves lengthwise. Paste the strip around the top the same as was suggested for the square box. Fig. 24 shows the result.

This is the season of the year when girls as well as boys are interested in all outdoor games, especially in playing horse. This interest creates a real need for something that may be used for reins in playing horse. The chain-stitch or finger crocheting, as it is often called, finds a place at this time. Make the reins of macrame. Begin by making a circle at one end of the cord as shown in Fig. 25. The fingers pass thru the loop shown at A, catch the cord at B, and draw the cord double thru the loop A. The part drawn thru forms another loop thru which the fingers again pass and a second loop is drawn thru. Continue until a piece long enough for reins is made. Fig. 26.

Fig. 27 shows a chain-stitch of two cords using two colors. First one string is pulled thru the loop and then the other.

MAY AND JUNE.

Construction Outline for Second Grade.

Cutting and Tearing.

This is the time of the year when the girls are playing jack stones and jumping rope. The boys are interested in marbles.

Have the pupils cut and tear figures to show pupils in various positions. Make the work a group problem, the outgrowth to be one large poster for the room.

Baseball and football make other interesting group problems.

Badges.

Badges for Memorial Day may be constructed by following directions for badges made for Lincoln's and Washington's Birthdays (February outline).

Purpose: *Score Card.*

To give pupils a practical problem in very simple ruling.

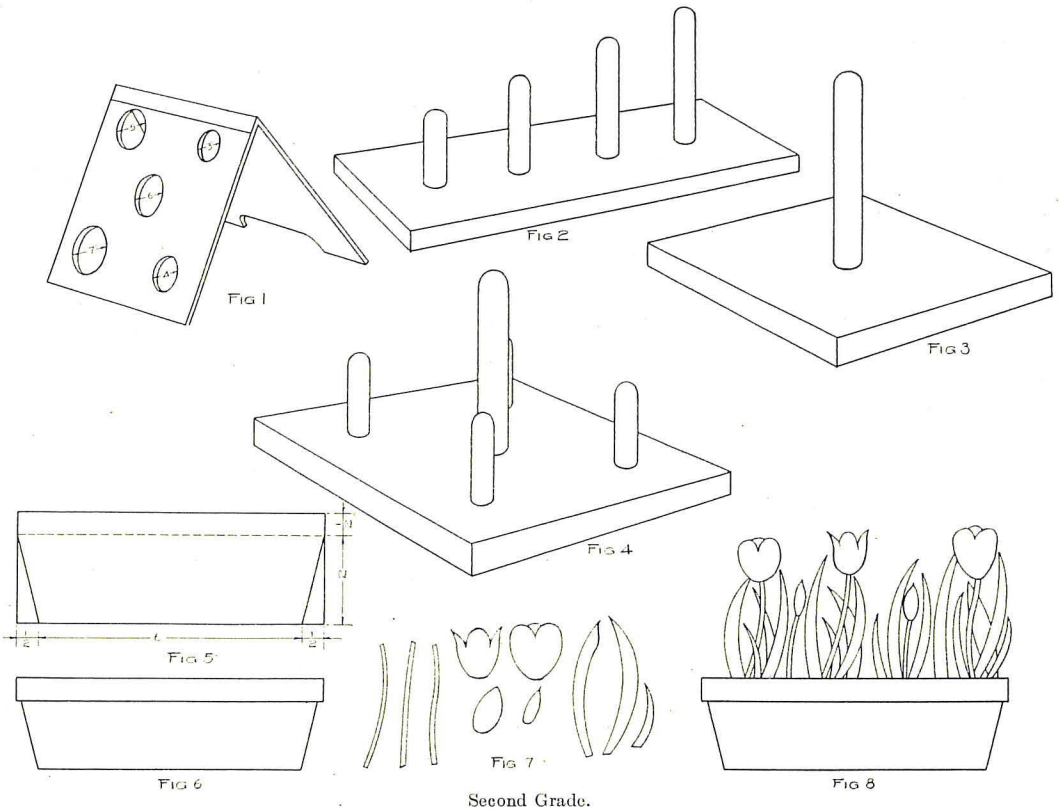
To give concrete number.

Material:

1 pk. of 6″x9″ manila drawing paper for the room.

Presentation:

All pupils are interested in playing games. This interest should be directed in such a way as to derive from it the greatest benefit to the child. Thru his interest in games comes an unconscious training in keeping systematically a simple record on the score card of each member of his class. His desire to know



Second Grade.

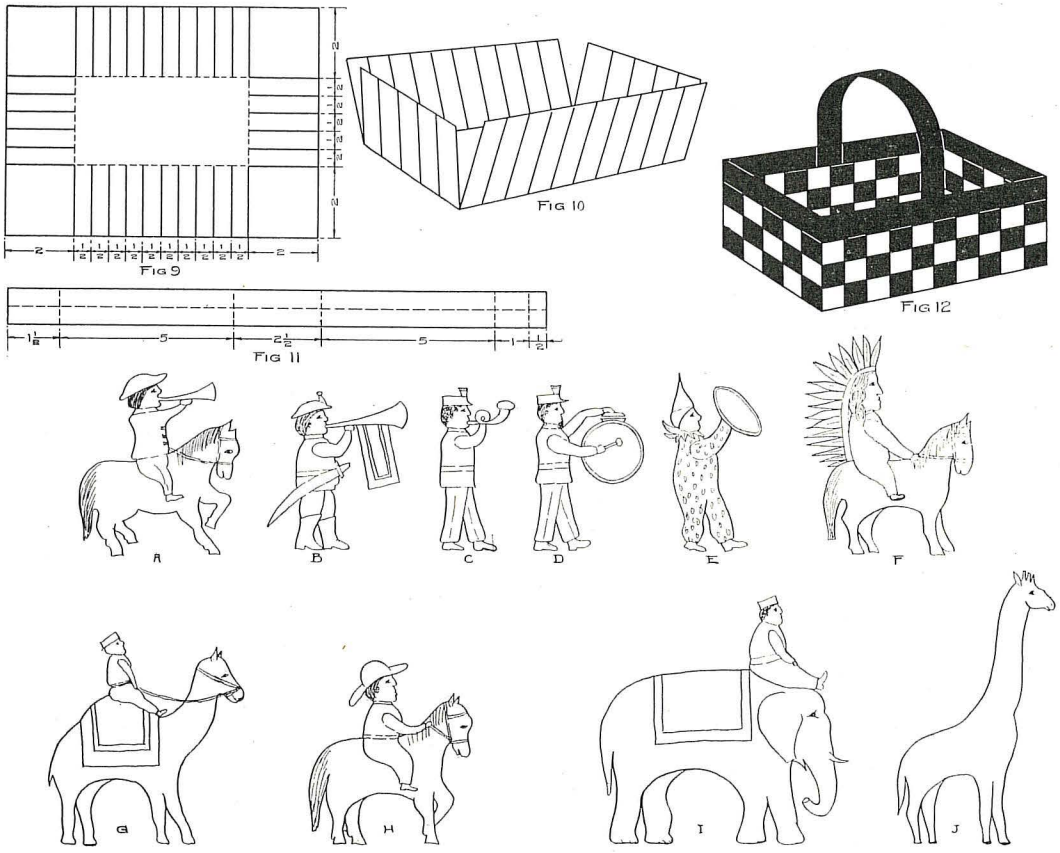


FIG 9 FIG 10 FIG 11 FIG 12

FIG 13

Second Grade.

various records involves a practical line of concrete number which paves the way to abstract number, which they must have as they advance in the grades.

Construction of Score Card.

Pass to each pupil a piece of 6″x9″ manila drawing paper. Place the paper so the short edge is parallel with the front edge of the desk. On the long edges, and one-half inch from the back right and left corners, place dots. Connect these dots by a straight line. On the remainder of the long edges place dots one inch apart, and connect corresponding dots by straight lines.

On the short edges of the paper place dots one inch apart. Connect corresponding dots by straight lines.

In the horizontal row of rectangles at the top place the number (Roman) to indicate the number of row.

The horizontal row at the bottom will be used for totals made by the individual pupils of the various rows. The vertical rows of squares are for the individual records, as will be shown in the explanation of the game.

The Game—Bean Bag.

To make the bag use ticking, canvas, a heavy unbleached muslin, or any other kind of cotton cloth sufficiently strong to hold the beans. Corn may be used.

Usually the "bean bag" game is tiresome because there are so few bags, thus making it necessary for pupils to wait while the bags are being collected. Have enough for at least six pupils. The game is also discouraging to pupils because the board as shown in Fig. 1 is used in the early part of the game. It is not an easy matter for the pupils to get the bag into the holes.

Make the game simple in the beginning.

First Game—Place the window pole across two chairs. Place a chalk mark on the floor showing where the thrower is to stand. If he can throw the bag across the pole give him credit for it.

Second Game—Place two chalk marks on the floor about ten feet apart. Have the thrower stand on one and throw the bag so it will go beyond the other.

Third Game—Make a circle of chalk on the floor. Place a mark about eight feet from the circle. Have the pupils stand on this mark and try to throw the bag in the circle. If he succeeds give him credit.

Fourth Game—Place several circles of different sizes on the floor, giving each a value. Have the pupils stand on the mark and aim to get the bag into some one of the circles.

Fifth Game—Place the waste basket on the floor. Have the pupils throw from a certain mark. The aim is to get the bag in the basket.

Sixth Game—Fig. 1 shows a drawing of a bean bag board. This may be made of two sheets of

clothboard, one used for the board and the other for the support at back. The support at back may be held in place by pasting a strip of cloth across the top.

The larger boys will be glad to cut the holes as indicated in the drawing. It is just possible that the boys at work in the manual training would make a board of wood.

Use of Score Card.

The purpose of the score card is to keep each child's record. Each square on the card represents a child's seat and into this square his score is to be placed.

If the teacher of the room is teaching the multiplication table of the 3's and the First Game is being played, then the value of each bag thrown over the pole should be three. Each pupil should throw more than one bag. If the pupil sitting in the seat indicated by the square just beneath the Roman 1 throws three bags and each one is thrown over the pole he makes a score of nine and is placed in the square.

If the next pupil throws three bags and only two go over the pole his score is six and is placed just under the nine in the square below. This is continued until each child has thrown three bags and the score card is filled. Each column is then added and the sum placed in the space left for the total.

In Game Four each circle may be given a different value and each pupil throws but one bag. If it is within the circle marked five and the teacher is developing the table of 2's, then his score is five times two. Two is taken as many times as is indicated by the value of the circle. The smaller the circle the greater the value. This value may be any amount the teacher wishes to make it.

When the score card is filled have the pupils add each column.

What score did each row make?

Which row made the highest score?

How much more did this row make than any other one?

What score did all the rows together make?

The teacher will find numerous other problems for the pupils to work out, using the score card as a basis.

A new score card is ruled for each game, thus making it possible to use the work during seat work time.

Ring Toss Game.

Figs. 2, 3, and 4 show various boards which may be used in the ring toss.

The rings may be made of half-inch rope so spliced as not to interfere in any way.

Use the score card in keeping records, the same as in the games of the bean bag.

The Flower Pot.

Draw and cut an oblong of brown construction paper 7 inches long and $2\frac{1}{2}$ inches high. Construct from this the flower pot as shown in Fig. 5. The half-inch at top is turned over as shown in Fig. 6.

The Stems, Leaves and Flowers.

The stems of the flowers shown in Fig. 7 may be cut of a light green paper.

Cut the leaves of a dark green paper by folding a rectangle lengthwise. (Fig. 7.)

From scraps of colored paper cut and paste the flowers to the stems, as shown in Fig. 8. Any kind of flowers may be selected, thus securing a great variety from any one class of pupils.

Fruit Basket.

Fig. 9 shows the pattern drawing for a very simple yet effective fruit basket. It is made of bogus bristol board or any other stiff paper.

Fig. 10 shows the sides turned upward, cut into half-inch strips. Half-inch strips having a length equal to the perimeter of the basket are cut and woven around the basket as shown in Fig. 12.

Fig. 11 shows the strip for encircling the top edge of the basket. It is creased lengthwise down

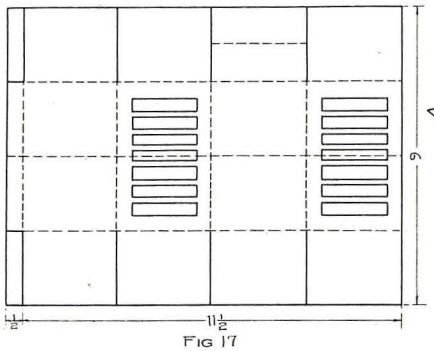


Fig 17

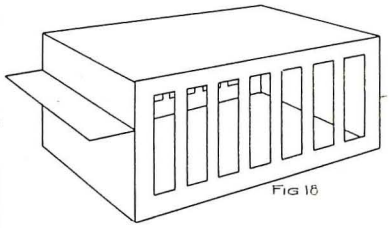


Fig 18


Fig 15


Fig 14


Fig 16

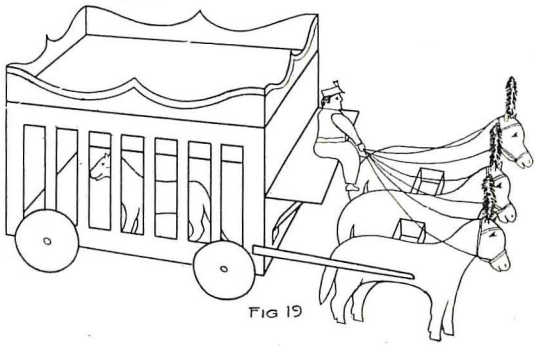
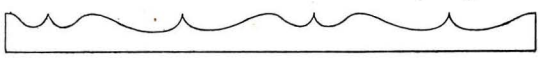


Fig 19



Second Grade.

the center, one-half being pasted to the inside of the basket and the other to the outside. The strip is cut so that the overlapping comes at one end.

A similar basket may be made by taking ten strips one-half inch wide and $4\frac{1}{2}$ inches long and 5 strips one-half inch wide and 9 inches long. The five 9-inch strips are laid horizontally on the desk and the $4\frac{1}{2}$-inch strips are woven across them.

The cross strips are pushed down so as to form the bottom of the basket. The two-inch ends of the strips are now turned upward and the remainder of the basket is completed the same as in the first basket described.

The Circus Parade.

There is no problem in the second grade that arouses more enthusiasm than that of the circus parade. It is a group problem in which every pupil of the class may be represented.

Fig. 13 shows a number of cuttings just as they were cut by second-grade pupils. A shows a trumpeter, B, C, and D members of the band, E the clown, F the Indian, G the camel, H the cowboy, I the elephant, and J the giraffe. All the pupils of the room cut each animal. The one cutting the best uses his as a pattern to cut all others just like it. There are always two or more of a kind in the parade. In order to make the animals stand, they must be pasted to a rectangular support as shown in Fig. 14. This support is made of a strip of paper as shown in Fig. 15. One end of the support is pasted to one side of the cutting, as shown in Fig. 16. The other cutting, which is exactly the same, is pasted to the other end of the support. This makes it possible for the two cuttings to stand. In this way two elephants may be held together, two camels, two lions, etc.

The Cages:

The cages may be made of the 9″x12″ tinted construction paper. The construction should be as simple as possible. The folding may be made as shown in Fig. 17. One-half inch is folded over along the left edge, as shown in Fig. 17. This is left folded while the remainder of the sheet is folded into sixteen divisions. Each side is folded double and cut as shown in Fig. 17. Fig. 18 shows the cage folded into shape and pasted. Fig. 19 shows the wheels added to the cage, the driver and horses in their proper places. Sometimes three or four pairs of horses are attached to one cage. Fig. 20 shows a fancy cutting which is pasted around the top of the cage as shown in Fig. 19. One can hardly realize what a wonderfully interesting group problem this is. The wagons and cages may be made more interesting by pasting colored pictures to the ends and sides. The wagons and cages may be made of different colors. Do not forget the band wagon with the musicians, the chariot, and the wonderful calliope which is always a part of the parade. The animals may be colored with colored crayons.

In the first grade the work was all centered on the flag. In this grade the three dimensions add a great deal to the interest.

MAY AND JUNE.

Construction Work for Third Grade.

Doll's Hammock.

This is a problem which will interest the boys of the third grade as well as the girls. The problem of the hammock involves a certain amount of work in design before beginning the work in weaving.

Confine the work in design to stripes, working for good proportion.

Purpose:

To continue the interest in weaving.

To afford opportunity for practical drawing.

To continue constructive number work.

Material:

Full sheets of jute board cut by the pupils to desired size.

2 brass rings $\frac{3}{4}$″ in diameter, or loops of string.

Colored candle wicking or any other weaving material not too coarse.

Harper packing needle for weaving or wooden needle.

Presentation:

To make the loom draw on a piece of cloth or strawboard a rectangle 5 inches by 9 inches, as shown in Fig. 1. On the short edges place dots one-fourth inch apart. Draw diagonals as shown in Fig. 1. With "A" as a center and a radius equal to half the length of the diagonal draw the arcs as shown in Fig. 1. If compasses cannot be borrowed from the fourth or fifth grade have the pupils make the strawboard circle maker as described in previous work and use it in drawing the curves shown in Fig. 1.

Connect corresponding dots by straight lines, allowing them to pass thru the dots to the curved line, Fig. 1. Where the straight lines meet the curved one, prick holes by using a darning needle. On the center line place dots one-fourth of an inch above and below the center, as shown in Fig. 1, and prick holes.

To String the Loom:

Take the two rings or loops of carpet warp and tie together and then tie to center of loom by passing ends of cord thru holes which have been pricked one-fourth of an inch from center, Fig. 3. Take a long needleful of twine, tie one end to a ring or loop, pass needle thru upper corner dot, turn the loom and pass thru opposite lower corner dot, then thru the other ring, back thru second lower dot, then thru second upper dot, and so on, until all the holes are strung with straight parallel strings on one side, Fig. 4. and oblique strings from holes to the rings on the other, Fig. 3. Fasten by tying to ring.

When piecing the carpet warp do so by tying on the side on which are the parallel strings, as the knots will then be covered by the weaving. It makes a more finished piece of work.

To Weave:

Place the loom on the desk so the short edge is parallel with the front edge of the desk. At the top and bottom make a selvage by doubling the string in the center and crossing it between each string of the warp, so that the string that was under becomes the upper one each time. This is called pairing, or "single twist" in basketry. Fig. 5.

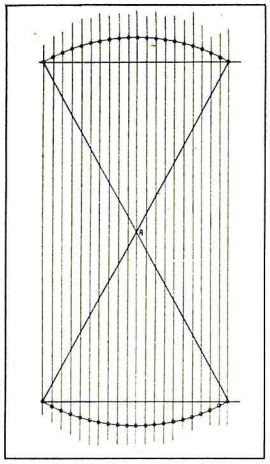


Fig 1

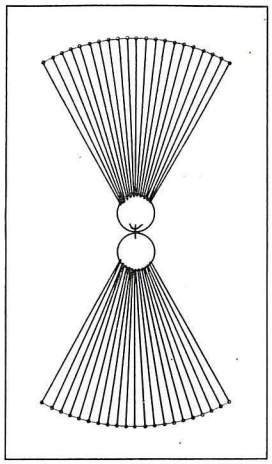


Fig 3

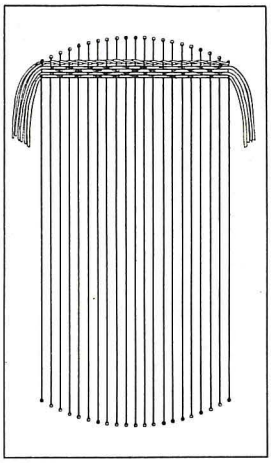


Fig 4

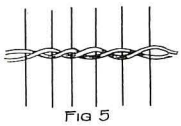


Fig 5

Fig 6

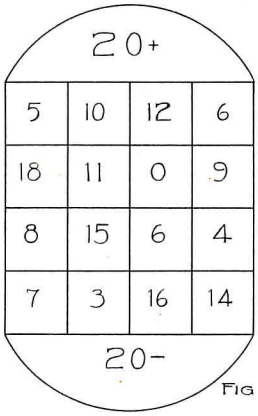


Fig 10

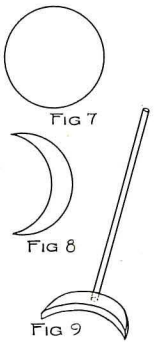


Fig 7

Fig 8

Fig 9

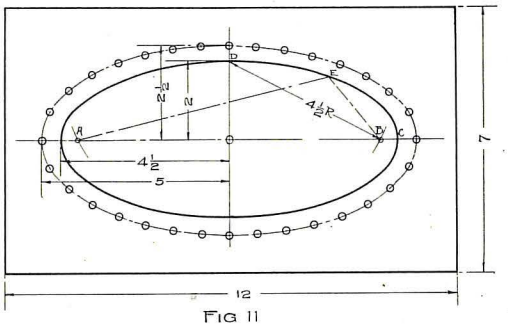


Fig 11

Third Grade.

Fig. 4. Pick up every other thread of the warp with the ruler, just as tho it were a wooden needle, turn it up on edge and it raises every other thread. Thru this opening (called shed) pass the Harper packing needle threaded with the twine of which the hammock is to be woven. Allow the ruler to again lie flat. Push it forward so as to press the thread just drawn thru close to those previously put in.

In carrying the weaver back push the ruler away from the weaving already done and weave back under and over with the needle. Leave the threads at each side long enough to make a fringe, as shown in Fig. 4.

To Tie the Fringe:

Hold the loom the long way and at right angles to the worker. Begin at the bottom and tie a knot as in Fig. 6. Even the fringe, cut the threads holding the rings or loops, and break the loom away at top and bottom, thus removing the hammock from the cardboard loom.

Score Card.

The score card is a very excellent exercise in ruling. It develops neatness, accuracy, and skill in doing the work.

See September outline for full directions on the score card.

The game there described is always interesting and may be used at this time. The following is a very good number game for third-grade pupils. On the score card is kept each pupil's record.

Shuffle Board.

This game is very popular on ocean steamers, as the passengers find much interest in playing the game.

To play the game it will be necessary for the manual training teacher of the older classes to construct the necessary equipment, which consists of the following:

6 disks of $\frac{7}{8}$" poplar 6 inches in diameter, Fig. 7.

6 crescent-shaped pieces of $\frac{7}{8}$" poplar, Fig. 8.

Each crescent has a handle made of a dowel rod, Fig. 9.

If the school does not have a manual training department there will be no difficulty in interesting

some child's father in making the necessary apparatus to play this very interesting game. Too much stress cannot be placed on the value of the practical number work which grows out of the playing of games.

On the floor is drawn a four-foot square divided into square feet, Fig. 10. To the front and back are drawn arcs, as shown in Fig. 10.

This drawing should be so placed as to run with the cracks in the floor. Within each square is found a number stating its value. The spaces in the front and back also have values.

A mark is placed on the floor to show where each one should stand when taking his part in the game.

To Play the Game.

Six pupils, each having a disk and a shuffle stick (crescent with handle) are ready to begin. The disk is placed on the floor and with the shuffle stick is given a push. If the disk lands in one of the squares the value of that square is credited to the one pushing it, and is recorded on the score board. If it lands in the space in the front that amount is taken from the record made by the row in which the pupil sits. As soon as one pupil has played he picks up the disk and shuffle stick and gives them to some other pupil. In this way the game does not lag and every pupil has an opportunity to take part in a single period.

Weaving a Stocking Cap.

In Fig. 11 is shown a working drawing of a loom on which a child may make a full-sized stocking cap. The stocking cap may be just a little out of season at this time.

It will not be possible for the pupils of the third grade to construct the loom. With a simple coping saw frame and blades and an ordinary gimlet, boys of the fifth and sixth grades will find no difficulty in constructing this particular kind of loom.

If the looms cannot be made in the school the expense will be very slight to have them made at a regular carpenter shop.

The drawing shown at Fig. 11 gives the details of the construction.

On a half-inch board of basswood 12″x7″ describe an ellipse in the following way:

Taking as a radius one-half the long diameter, which is equal to O-C, and placing one leg of the compass at D, draw the arcs which intersect the long diameter at the points marked A and B. Place tacks at the points marked A, B, and D. Loop and tie a string around the three tacks. Remove the tack at D and place a pencil point in its place. Move the pencil, which is guided by the string, and the ellipse is drawn. The second ellipse on which the holes for the pegs are marked is secured in the way above mentioned, only making the ellipse one-half inch larger. In this case a radius of five inches

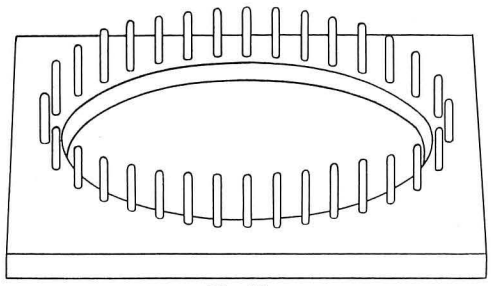


Fig 12

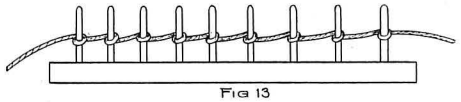


Fig 13

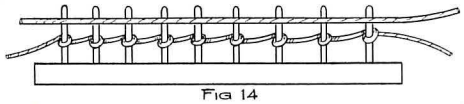


Fig 14

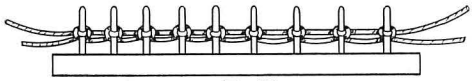


Fig 15
Third Grade.

is used instead of four and one-half. The leg of the compass is placed one-half inch above D, and the new arcs cut the long diameter at the point to the right of B, and at the point to the left of A.

Place the tacks as before and loop the string around them.

The holes on the circumference of the larger ellipse are placed three-fourths of an inch apart, one-half inch deep, one-fourth inch in diameter.

The Pegs:

For the pegs use $\frac{1}{4}$″ dowel rods, cut into pieces $1\frac{1}{2}$″ long. The holes may be bored thru the $\frac{1}{2}$″ basswood. Smooth the pegs with sandpaper; dip one end of each in glue and force them into the holes. Fig. 12 shows the dowels in place ready for the weaving.

To Do the Weaving:

The weaving on this loom is done the same as when weaving the mitten cords on the spool with the four pins.

Germantown is the best wool to use. The yarn is first twisted around the pegs as shown in Fig. 13. After twisting the yarn round each peg the weaving is done by holding the yarn just above the twist. Fig. 14.

With a darning needle lift the loop over the yarn on the peg, as shown in Fig. 15. This is continued until a piece is woven twice as long as the stocking cap is to be when finished. When the weaving is completed it is removed from the loom. One end is drawn thru the weaving until it meets the other open end. These two ends are drawn together and a tassel is sewed on at this place. The other open end fits on to the head.

Caps of any size may be made by constructed looms of various sizes.

A loom made by drawing a three-inch circle and placing the pegs makes a good size on which to weave stocking caps for dolls. By weaving just a long double piece, and drawing it together at the ends a good fur for a doll is made while the muff may be made by leaving ends of a double piece open.

What has been given will suggest to the wide-awake teacher any number of new articles which may be woven on these looms.

VENEERING AND INLAYING

G. M. Nyman, Woodward High School, Cincinnati, O.

(Third Article)

How Veneer is Affected by Glue.

AS hot glue is spread on thin veneer, the side receiving the glue will immediately begin to expand. This action is so rapid that in ten minutes the flat veneer may have formed a complete tube, due to one-sided expansion of the veneer. If let alone to dry, the tube will gradually flatten out and then begin to curl in the opposite direction and if left over night, the contraction of the glue will cause the tube to turn inside out.

It is evident, therefore, that the glue should be spread onto the thickest member of the veneer joint (the core). However, if cross banding is used, it is customary to spread it on both sides. The first side is laid down on narrow strips (triangular shape preferable) to avoid rubbing off glue on this side while the other side is being spread. One side of the cross banding is laid on the core; the other side receiving the face veneer. Each side of the cross banding must have sufficient glue to cover the adjacent unglued surface, with some to spare. The glue should be spread on—not painted, as beginners have a tendency to do. The latter process may cause starved joints with resultant blisters.

Hints for Prevention of Warping and Checking of Veneered Stock.

The thicker grades of sliced and rotary-cut veneer are more or less ruptured as the log revolves against the knife and it is important to lay such veneer with the ruptured side down; in this way avoiding small checks in the finished article.

The warping of veneered stock may be traced to a number of causes. One or the other of those mentioned below may be responsible or perhaps a combination of them:

The veneer on the back not being equal in strength and pulling power to the one on face.

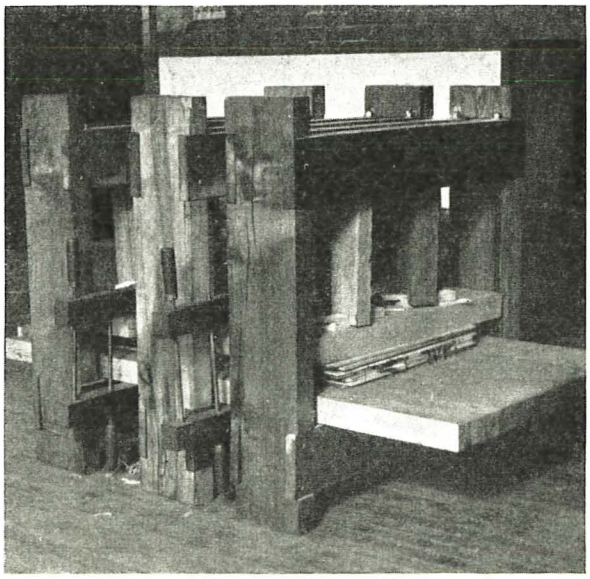
The caul on one side may have been warmer and caused more expansion than the one on the other side.

The grain in one veneer running diagonally may give a twist to a thin panel.

In most cases, however, the warping is caused by the core being the strongest single member; it may warp the whole according to its tendencies. If, as in thin panels, the core is rotary-cut $\frac{1}{8}''$ poplar or birch, the tendency is to curl in the way it was cut from the log, but in many cases this can be used to advantage. Cores, built up of strips (laminated) will not warp, nor will quarter-sawed woods. Plain sawed wood will incorporate the same tendencies in a veneered job as when used by itself.

Application of Glue and Pressure.

When about to veneer have sufficient glue on hand to do the work intended. To run short is an exasperating situation. Also have enough cauls for the job—this means one more than the number of pieces to be veneered. The uppermost one must be thick enough (See Cauls) to distribute the pressure. If handscrews are used, the bottom caul must be thick also, for the same reason. Cauls, as a rule, are kept a uniform thickness. Added stiffness can be obtained by placing an extra caul on top, or if metal cauls are used, the last one is backed up with wood. Have all cauls warmed and greased. Estimate the thickness of the batch to be veneered and adjust screws to the approximate size. The pressure is applied to cross pieces—common two by fours—put on top of the whole; on bottom also if handscrews are used.

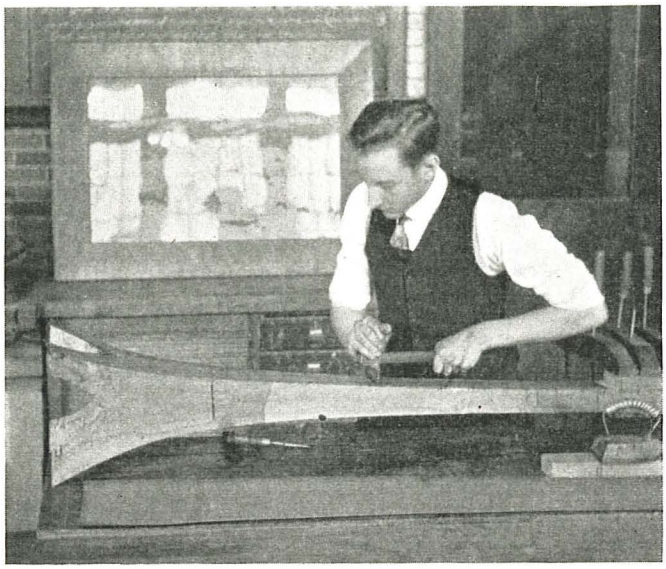


GLUE PRESS IN USE.

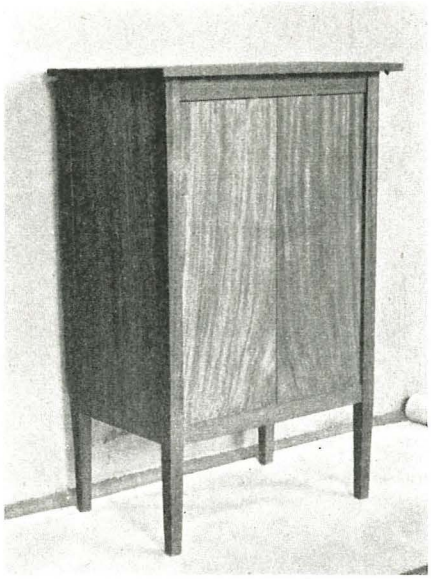
Glue Press designed by the author and made by industrial students at the Woodward High School.

The sections and bottom are made of 3 in. beech, which was unfit for ordinary use on account of checks, but strong enough for such a press. The cut shows the press in use without the screws, the pressure being obtained with blocks and wedges, but as soon as the boys in the machine shop have finished the nuts and screws, they will be hung 3 to each section.

While the nuts and screws are expensive, difficult for the boys to make and, in some places unobtainable, one can use bench vise screws instead, but being weaker, more of these will be required and greater care exercised when applying pressure.



Veneering by the Rubbing Method.



Veneered Cabinet made in the Author's Classes.

In case wide pieces are to be veneered by the use of handscrews, some precaution must be taken to insure pressure in the middle, where the handscrews will not reach. This is done by rounding the cross pieces in such a way that they will press on the center first. About one-quarter inch at the ends rounded to nothing will do the work. Alternate rounded and flat cross pieces, two of a kind opposing each other. This will insure even distribution of the pressure.

The Care of Stock—Veneered and Otherwise.

It takes about three days for a batch of veneered work to dry. During this time, it should be piled on sticks, or the top piece covered to insure even drying. Stock, veneered on one side, should have that side covered, as slow drying will retard possible warping and checking.

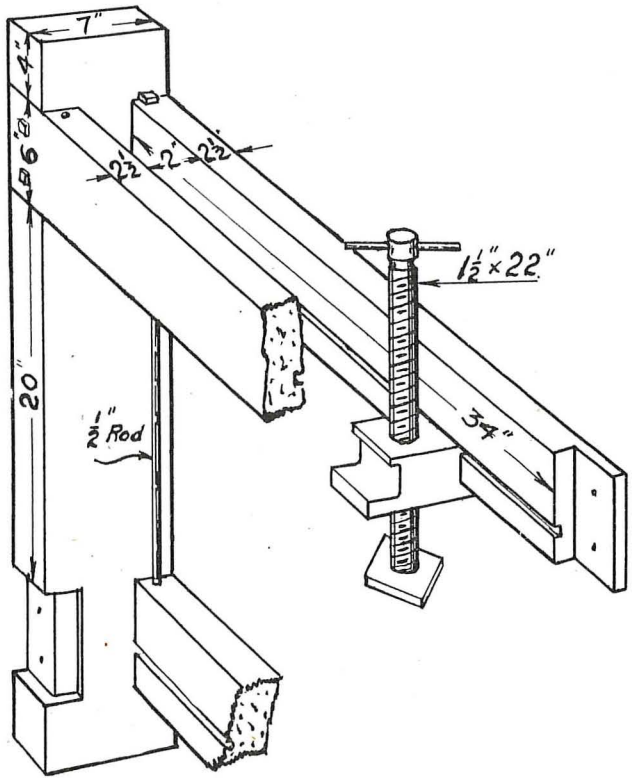
In this connection a few words, regarding the general care of work under construction in school shops, will perhaps be helpful. As a rule the atmosphere in the shop is dryer than the lumber used and until the moisture in the shop and lumber is equalized, the seasoning of the latter will go on. As the moisture evaporates, the lumber will shrink. A board, evenly exposed to air on both sides, should, according to theory, remain straight and it will in most cases if the lumber is quarter-sawed. Plain lumber, however, will warp under the same conditions, causing the bark side to be more or less concave, with a corresponding bulge on the heart or pith side. Hence all such lumber should be put away with the pith sides exposed to the drying influence of the air. The pull, then caused by the shrinkage of those sides, is opposed by the strong resistance of the bark sides and the lumber usually remains straight.

The Rubbing Method.

Another method of veneering—second in importance to the one previously mentioned—is the rubbing method, getting its name from the way the veneer is rubbed down and surplus glue rubbed out in a series of strokes with the broad pien of a veneer hammer.

This process requires more skill than the pressure method and is done in the following manner:

The core is tooth planed and glue sized. When dry, it is again tooth planed slightly to remove any little bumps. In the meantime the glue is prepared; two flat-irons heated; face veneer cut and dampened down and the glue is then applied to the entire surface of the core—if same is not too large. Larger



Sketch for one section of Veneer Glue Press.

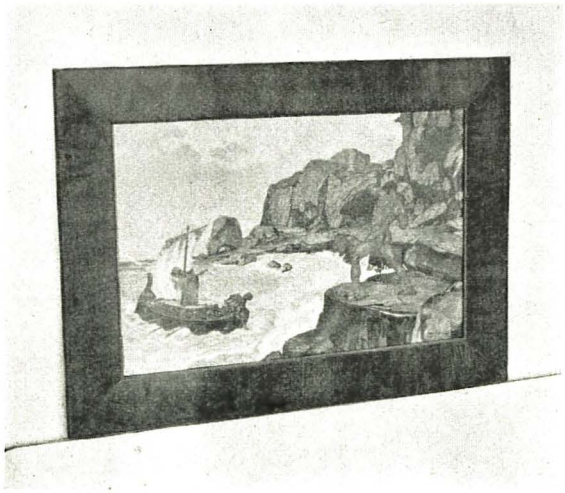
surfaces are spread and rubbed down in sections. The face veneer is then put in place and one of the flat-irons applied to face veneer in middle of one end. The hot iron will reheat the glue on as large a surface as is convenient to rub down with the veneer hammer before the glue gets chilled. Proceed with the rubbing in this way:

Hold the veneer in place with one hand while hammer is rubbed on warmed spot with other hand. The first strokes are generally made from eight inches to ten inches in toward the end. This should bring out some surplus glue, indicating that the conditions are right. If not, moisten veneer on top and apply flat-iron until the desired result is obtained—removal of surplus glue and air. The veneer then will adhere to the core. As soon as this is accomplished in one place, the veneer hammer is grasped in both hands—the right pulling and steadying the handle, while the left is pressed down on the hammer head. The motions are with the grain and diagonal—all the while pressing the veneer down and the glue forward and to the sides. Apply the flat-iron and reheat another section, repeat and the job will be finished in a short time.

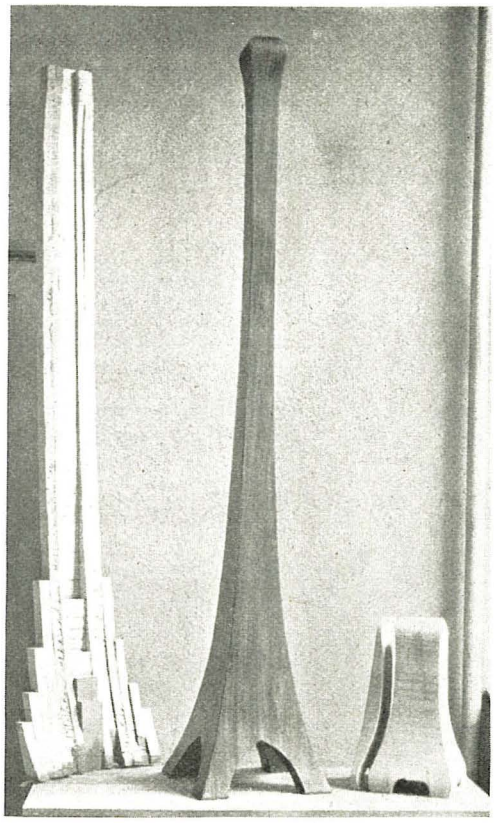
Apply no more moisture than is needed and avoid stretching the veneer as it is rubbed down. The greatest drawback to this process is the expansion, with accompanying evils. While this method of veneering is mostly relegated to the fixing of imperfect glue-press work and special complex curve work, it is still used and therefore mentioned here.

From the school shop standpoint, it has the pleasing feature of not requiring many additional tools. In fact, the only tools it will be necessary to acquire are two flat-irons and a veneer hammer. The remainder—chisel, square, T-bevel, and a straight edge—are found in most shops. Supplies needed are hot glue and veneer.

Knife-cut mahogany is easiest to lay by this method; however, a skilled operator can lay any kind of thin veneer.



A Veneered Picture Frame.



Veneered Floor Lamp Standard. Single veneer rubbed on. At left waste, showing method of gluing up.

In our shop the boys have successfully veneered several large floor lamps, employing the rubbing method. The lamps in question were 5 feet high, had a slender tapering body, increasing in size to twelve inches at the base. Being too large for accurate band-sawing, the lamps were planed to proper curve and veneered by the foregoing method.

Veneering of Frames.

Frames are readily veneered and corners mitred in this manner: Veneer the stiles first, then the rails—the veneer on ends of the latter overlapping the former. Enough of the surplus veneer is then trimmed off on the inside of the frame to allow a rest for 45-degree angle, or T-bevel as the case may be, and the overlapping veneers are cut thru with a thin sharp chisel. The waste part of the topmost veneer is removed without effort, but in order to remove waste part of underlying veneer, it is necessary to reheat this spot with the flat-iron, turn up the end and remove underneath waste piece, putting a little glue in its place. The turned-up end is now rubbed in place and the joint is taped to prevent opening while drying. A mitre of this kind is bound to fit, as the two members are cut at the same time.

Friezes and borders of panels, drawers, etc., are done in the same manner.

One advantage of this method is that the work is visible at all times.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

THE SMITH-HUGHES ACT.

A FEW years ago, in an educational convention, we heard vocational education characterized as a homeless waif left on the doorstep of the educational household. During the past two months Uncle Sam has adopted the homeless waif and provided an increasing annuity beginning with $1,700,000 for his support. Like other millionaire youngsters, he is going to attract considerable attention within the next few years. It is altogether possible that, like other inexperienced youths, he will go wrong. The temptations in this direction will be numerous and it will be only by the most careful management that he will accomplish all that his progenitors hoped for him.

There will be new positions open for promoters and developers and it is to be hoped that we will not witness an unprofessional scrambling with wire-pulling and dickering for position. If there is to be a national director of vocational education, that person should be the one who is best prepared for the position and the one who is best able to propose a sane, feasible program. It is safe to assume that the person with these qualifications will realize the immensity of the problem and will shrink somewhat from the responsibility. The position is, without doubt, one which should seek the man. It should not be held out to those who make it their business to strive for promotion.

Many things must be determined before any definite program can be agreed upon. The members of the Federal board of control must be appointed. The board will probably elect a man to act as director. Then conferences must be held with state boards and certain standards must be set up. As the appropriations for the expenses of the board are not available until July 1st it is not probable that much can be done before that time. The first money to be appropriated to the states will not be available until July 1st, 1918, so there will be time for due deliberation and planning.

Teachers of the industrial arts should not promise their boards too much under the terms of the Smith-Hughes Act. They will do well to study the act quite carefully as it states quite clearly the character of the work that will be aided. The controlling purpose of such education shall be to fit for useful employment; it shall be of less than college grade, and shall be designed to meet the needs of persons over 14 year of age who are preparing for a trade or industrial pursuit or who have entered upon the work of a trade or industrial pursuit. Schools or classes giving instruction to persons who have not entered upon employment shall require that at least half of the time of such instruction be given to practical work on a useful or productive basis, such instruction to extend over not less than nine months a year and not less than thirty hours per week. Evening classes shall be open only to those over 16 years of age and shall confine their instruction to that which is supplemental to the daily employment.

There are other restrictions and provisions which must be observed. No National Aid will be given to what has gone in many places by the name of manual training. Without questioning its value, we doubt whether manual training will be promoted by the law. It is altogether possible that the opposite will be the case. When a community learns that there is one kind of school shopwork which will have one-half the salary of the teachers paid out of the National Treasury and the other kind will not be so aided, it may be difficult for the teacher of the kind not aided to justify his existence.

ON TEACHERS' MEETINGS.

THE majority of teachers' meetings are devoted to the presentation of inspirational addresses by notables. Teachers go in a receptive mood and sit passively thru the reflections and assertions of celebrities.

It is significant that too little business is carried over from one annual meeting to another thru the report of working committees appointed by teachers' organizations, and that little discussion of the school problems takes place among the assembled teachers. Teachers' meetings are quite often planned to entertain and instruct teachers rather than to allow free discussion or to carry on investigation thru committees.

In a message from the General Conference Committee of the High School Conference of Illinois, published in the proceedings of this organization is this significant statement: "The great weakness of our numerous educational rallies lies in the fact that teachers are constantly held in a state of receptivity. The great mass of them never participate, never are given opportunity for reaction. Yet it is well known that reaction is the final and completing stage of experience without which there is no effective education."

Reform in this important matter lies very much with the teachers themselves, and should be prompted by their school experience, which convinces them that there must be a reaction from the assembled teachers to secure results which warrant the very great in-

vestment of their time and money in attending meetings.

Let us resolve as teachers to provoke reaction at the next meeting we attend. Let us resolve to take part in every discussion that is offered even to braving the possibility of exposing our ignorance. The exposure of ignorance at teachers' meetings is a great stimulation to the silent but wise brother who might carry his wisdom unexpressed and unobserved. Moreover, the exposure of ignorance is rarely a sacrifice at a teachers' meeting because the teacher among teachers is not supposed to know it all. The teacher who knows it all has no need of meetings.

If adequate opportunity is not offered at the next teachers' meeting we attend, let us resolve to wait the call of new business by the chairman, and then proclaim ourselves as skilful teachers, by proposing such a series of problems referred to committees that the meetings of next year will be more productive. Let us use the same pedagogical advantage in our meetings that we use in our classrooms.

REPAIR WORK.

IF properly handled, repair work for industrial-arts classes has great possibilities. It brings actuality into the work. It supplies certain principles of production that are most helpful, provided such work is not carried to the point of exploitation at the expense of the students.

The Editors of the *Industrial-Arts Magazine* have insisted from the very beginning upon the vitalization of our work by bringing into it the *real job*. We have denied from the first the sacredness or even the existence of the time honored and immutable "sequence of tool processes." We want the reality that genuine production, repair work, and any other form of industrial enterprises can give.

However, it makes a tremendous difference *how* the repair work is handled. We most heartily approve the use of it as a *part* of an *organized* scheme of work. We just as heartily disapprove of any suggestion based upon the assumption that school shops should be *mere* repair shops and nothing more. We withhold our approval from any scheme that places our department upon the wasteful, haphazard, inefficient basis of the exigencies of the daily grind, the wear and tear of school property, or the caprice or inefficiency of the school janitors. We shouldn't enjoy the prospect of having our classes wait for something to break so they could have the job of fixing it. Neither should we enjoy having so much repair work that there remained no time for other essential phases of the work.

Let us make use of the repair work. Let us organize it and make it a part of our regular scheme. But let us not feel when we have done a little repair work that the whole problem of vocational education has been solved.

WOODEN CANDLESTICKS AGAIN.

The more experience we have in this writing of editorials, the more convinced we become that it is well nigh impossible to get our ideas over to the reader so that he will understand just what we wish to express. We find, for example, that the editorial in which we tried to say that we do not feel that manual training should be consigned to the bow-wows because boys sometimes make candlesticks, and that those who favor the making of marketable products in the school shops are inconsistent in condemning the wood candlesticks when wooden candlesticks are being marketed in the best jewelry and furniture houses, has been taken to mean that we favor the use of wooden candlesticks. We willingly admit that the fault is all ours for if our esteemed friend Arthur Dean doesn't get our idea, we must have concealed it entirely. Judging from the March School Arts Magazine, this must be the case.

However, we are not altogether sorry that we published that editorial for it at least brought to light the originator of this offender against artistic ideals. Nevertheless, we do think it unkind of Friend Dean, when we are endeavoring to shield the cause of manual training from the consequences of his early indiscretion in correlation, to associate us with those who screw earrings on their ears, have monkey parties and wear diamonds in their front teeth. As to wearing celluloid collars at a summer camp—Horrors! A man who wears any kind of collar on a camping trip is tempting fate! And for a man who smokes a wooden pipe to condemn wooden candlesticks! Such inconsistency! Besides candlesticks usually have brass bowls to protect them while all a pipe has is the inhaler at the end.

We willingly grant without argument the point Mr. Dean makes, altho we cannot accept without some reservations the testimony of a man regarding what happened when he was asleep. Maybe a pipe was responsible for the fire, or perchance in his dreams he was landing a big one and knocked the candle over.

We are sure Mr. Dean will agree with us that the whole cause of Manual Training should not be condemned because of one inconsistency or shortcoming. The all-important factor in the case is not whether a boy is taught to use a lathe by making wood candlesticks or potato mashers any more than it is the kind of paper a child learns to write on. We have known children to learn to write fairly well on slates. It seems to us that the chief thing to be learned in a wood turning shop is how to operate a lathe and handle the chisels. Whether this is learned making candlesticks, potato mashers, stocking darners or ball bats is of somewhat minor importance, altho we are in perfect agreement with the proposition that things should be "adapted to purpose, material and place."

TRAINING THE HANDICAPPED

W. I. Hamilton, Agent, Massachusetts State Board of Education

There has just come from the press a report of the Massachusetts Board of Education on Training for Injured Persons. The report is based on an investigation undertaken at the direction of the state legislature. Briefly, the report recommends the establishment of a bureau under the direction of the State Board of Education for the purpose of providing facilities for training persons injured thru industrial accident. The board, with the evidence at its command, estimates the expense of such a bureau for the first year as $17,000.00.

Findings.

The findings on which the recommendations are based are briefly summarized as follows:

1. The number of serious industrial accidents is much greater among males than females.

2. The number of accidents to workers between the ages of twenty-one and forty is greater than the number among all other groups combined. Between these ages experience has shown that people in general are still trainable; that is, motor co-ordinations and reactions can be established as habits, and degrees of skill, depending upon the capacities of individuals, can be attained.

3. The number of serious accidents occurring in skilled trades, with the possible exception of carpentry, is relatively small; on the other hand, the greatest number of accidents occur in unskilled and semi-skilled occupations.

4. The number of serious accidents to immigrants with relatively little formal education or specific training for vocations is relatively large. These conditions must receive consideration in projecting plans for future training.

5. Thru "compensation" a considerable number of individuals are enabled to change to another occupation in which they are self-supporting, or to leave the country.

6. No agencies exist at public expense, in Massachusetts, for ascertaining the number of people who might be trained.

7. There are in Massachusetts only private or semi-private agencies for advising injured people as to methods of obtaining a livelihood, securing means of training or placing them in positions.

8. In general, the problem of training blind or crippled adults, as distinct from blind and crippled children, has as yet received little public recognition in this country in the form of legislative enactment or provisions for training in institutions or elsewhere.

9. Experience in foreign countries and to a less degree in this country has shown that large numbers of people crippled as a result of accident or otherwise can in their adult years be trained to perform work enabling them to become self-supporting, but the methods of training are still in a tentative and experimental rather than a demonstrated stage of development.

10. Injuries to one eye while frequent do not as a rule prevent the worker from pursuing the vocation upon which he has entered, while injuries to both eyes are rare.

The board finds that the Commission for the Blind is already training workers suffering from injuries of this nature, and is of the opinion that any extension of such work should be under the direction of that commission.

11. In view of the age, limited previous training and type of occupations engaged in prior to time of injury, no positive assertions can be made regarding the numbers of people suffering from loss of or serious injury to a hand or other crippling injury who can be trained for skilled employments. Experience shows in individual cases that by an adaptation of tools and other means such possibilities exist and should be sought out. Research and experiment have shown that possibilities for training for profitable employment exist in a variety of semi-skilled occupations, but in few of these have predetermined training courses been organized even for the uninjured, except such as are given on the work in the industries.

The organization of such training courses being a matter regarding which little positive knowledge is available, a considerable amount of research and experiment is desirable before it is attempted on any large scale.

12. It has been asserted by many people familiar with this work that employers prefer to employ persons suffering no handicap. Considerations regarding speed, amount of output, safety and standardization of tools and equipment all contribute to this attitude. Altho little first-hand investigation has been practicable with the evidence at command, it is believed that the problem of placing handicapped persons in industry in competition with the uninjured is, under present industrial conditions, a serious one, and one that requires further investigation and experiment before definite conclusions can be stated and final recommendations made.

Proposals.

The report discusses certain proposals that have been made looking toward the establishment of training agencies for the handicapped. Among these are the utilization of existing state-aided schools, training schemes in industrial plants, and a state-wide survey for determining the number of handicapped. The latter, while recognized as an important matter and one that would yield large social returns, should, in the opinion of the board, be postponed until the results of the Cleveland survey are made available.

Recommendations.

With the material at hand, however, the board makes certain specific recommendations. The following is quoted from the report:

"For the purpose of further investigation and also of establishing an opportunity for wise experimenting under favorable conditions, the board recommends that a bureau be established, under the direction of the Board of Education, which shall undertake in a limited way, until such time as recommendations based on experience can be made, the training of persons whose earning capacity has been seriously impaired thru accident or disease.

"In recommending opportunities for training and placing the handicapped in industry, the board is not suggesting an entirely new state policy. The Commission for the Blind is already doing similar work for people handicapped by blindness and eye injuries. The board is proposing an extension of a state policy already in operation, to include additional groups of handicapped people.

"The work needed is briefly discussed in Section 3, 'The Rehabilitation of the Injured Worker.' The bureau recommended should undertake all the lines of work therein suggested found to be practicable.

"The board submits the following draft of an act for carrying into effect this recommendation:

"*An Act to Provide Facilities for Training Injured Persons.*

"Be it enacted, etc., as follows:

"Section 1. There shall be established, under the direction of the board of education, a bureau for the training and instruction of persons who, thru industrial accident or industrial disease, have suffered the loss of or injury to a limb, or other severe injury, and whose earning capacity has been destroyed or impaired thereby, for the purpose of re-establishing or increasing the ability of such persons to earn a livelihood.

"Section 2. It shall be the duty of the board, thru the bureau, to establish co-operative relations so far as possible with existing agencies dealing with injured persons, and so far as practicable to establish and maintain, or assist in establishing and maintaining, such additional agencies as may be necessary for the instruction, training and placement in employment of persons described in section one herein.

"Section 3. In order to carry out the purposes of this act the board may establish training facilities in schools sup-

ported wholly or in part by funds of the commonwealth, and in such other places as may be practicable.

"Section 4. It shall be the duty of the board, thru the bureau, by means of information and advice, to aid physically handicapped persons, whether so handicapped by industrial accident, disease or otherwise, in choosing an occupation, in obtaining training and in securing employment. The bureau shall issue from time to time bulletins containing such information.

"Section 5. The bureau shall be provided with suitable offices, at the expense of the commonwealth, and shall be allowed for salaries of agents and teachers, clerical and other assistance, traveling and other necessary expenses, such an amount as shall be appropriated annually by the general court, payable out of the treasury of the commonwealth.

"Section 6. The board of education shall make an annual report to the general court covering the work of the bureau, said report to be printed as a public document.

"Section 7. This act shall take effect upon its passage."

A VALUABLE REPORT.

Prepared by John C. Brodhead for the Boston Manual Training Club.

A report of the Educational Committee of the Boston Manual Training Club on "The Place and Function of Manual Training in an Educational System," was the subject of a paper read by Mr. John C. Brodhead, Associate Director of Manual Arts, Boston, Mass., at the regular January meeting of the Boston Manual Training Club. The committee has spent over two years in gathering valuable data as to courses, from experts in the various lines. The report will be of value to educators and will be available as a national publication. The committee, in its report, gives the following as a result of its study:

Manual training aims to provide for the needs of children from 12 to 16 years.

Training for the appreciation of all life's activities is recommended and the development of good citizenship is urged. Local authorities have failed to grasp the situation, by providing the needed time, purchasing necessary equipment or paying adequate salaries.

Teaching with a more strictly vocational trend is demanded for a broader view of life. Manual training has broken academic traditions, increased high school attendance, trained the boy to a more logical form of expression and many times opened the way to industrial activities.

A sympathetic understanding of all life's activities will be the result of this broader presentation. The need of manual training never was greater than it is today, and it should be expressed in nine major activities, if it would fulfill its adequate mission.

A very careful analysis of courses in the various trades was submitted, based on proper time allotments. A minimum of four hours a week is desired, with individual teaching and special adaptation to environment.

The twentieth century citizen depends on the sciences and in the present complex situation of society, the manual training teacher has a greater responsibility and a wider field of activity. He is needed to teach creative interests, to find ability to develop it, to uncover tastes and ability for vocational work, and to bring the boys into a more complete contact with life.

The above brief sketch does little justice to a most comprehensive report. It is valuable as a guide, as a means of information, and as an indication of its optimistic spirit.

WHAT THE ART DEPARTMENT SEEKS TO DO.

As a summary of the purpose and function of the art department in the New York City High Schools, the following ten statements are offered. They define what the department seeks to do.

1. To train "the many" in the power of aesthetic appreciation. To send them out of the schools "aesthetically alive" to their surroundings. To aid thus in the creation of an art-loving public.

2. To train "the few" to a high order of technical ability as draughtsmen and industrial designers. To sift out these talented pupils early and cause them to specialize in the direction of their talents.

3. To differentiate the work of each high school to meet the needs of its community, and further, to differentiate the courses within each school that the capacities of different types of students may be specifically met.

4. To cause pupils to realize that there is a "cash value" in industrial art education; i. e., that it is profitable to the talented student to cultivate that talent along industrial art lines.

5. To secure the co-operation of all teaching agencies in forwarding the aims of the department, these agencies to include museums, art societies, civic and merchants' associations, loan exhibitions, docent service, organized courses for teachers, systematic conferences, etc.

6. To make the work of the art department of the high schools touch the life of the school at many angles thru loan exhibitions, assistance with plays and pageants, artistic supervision of bulletin boards, preparation of posters, assembly art talks, etc.

7. To show public-spirited employers that the development of native talent in the industrial arts is an economic necessity on the part of the state, and that this development cannot take place unless these employers aid.

8. To develop an industrial art school with a variety of day and evening courses designed to fit workers for the highly specialized work of the more important art trades. To offer in this school an opportunity for the completion of the special training begun in the high schools.

9. Until a free city industrial art school is organized, to provide at least one scholarship in industrial art each term in each high school. This scholarship should offer one year of free post-graduate instruction to a pupil who wishes to specialize as an industrial art worker.

10. To secure well decorated school buildings thru the purchase of appropriate pictures, and to bring together artists, donors and school authorities to the end that mural paintings may be designed and installed in the schools. —*James Parton Haney.*

INDUSTRIAL ARTS ROUND TABLE—CHICAGO AND VICINITY.

The second meeting of the Industrial Arts Round Table was held at Lewis Institute, Chicago, on Friday evening, March 9th. After enjoying a dinner, prepared under the supervision of Miss Hood, of the Domestic Science Department, and spending some time in social intercourse, the program of the evening was taken up. As planned at the previous meeting, reports of the Indianapolis convention of the National Society for the Promotion of Industrial Education were given by several of the members who were in attendance at that meeting. Discussion of some of the topics were entered into by the members, especially the training of teachers. Copies of the Smith-Hughes bill had been mailed to the members before the meeting and some discussion of this measure and its results was taken up. Following this came an informal discussion of a proposed bill for a vocational education law, which is under consideration with a view to its presentation in the legislature of Illinois. Copies of this bill had been procured by the chairman, who explained the important features of the bill, calling especial attention to the points of difference between this bill and the bills which had been previously introduced in Illinois.

The members of the club feel that the opportunity for an informal discussion on various topics is one of the valuable features of the club. The plan of sending out material in advance of the meetings dealing with the topics of the evening, furnishes an opportunity for making this club what its name implies; a round table for study purposes.

The third meeting of the club was held at the University of Chicago, on April 13th, at the time of the High School conference.

SOUTHWEST OKLAHOMA MANUAL ARTS TEACHERS.

The Manual Arts Department of the Southwest Oklahoma Teachers' Association held its regular annual session

Feb. 23, 1917. The program included papers and discussions as follows:

The Need of Organization in the Teaching of Manual Arts, by D. B. Pickett, of Cordell.

What Should be the Scope of Manual Training in the Average High School, by Geo. E. Davenport, of Elk City.

Teaching Methods in Manual Arts, by J. Franklin Short, of Hobart.

Manual Training in the Rural School, by A. L. Hunt, of Carter.

Discussion by J. M. Shook, of Louis; W. M. Gentry, of Willow; G. H. Davis, of Durham; J. C. Conrad, of Roosevelt.

THE NEW HOME ECONOMICS BUILDING, THE STOUT INSTITUTE, MENOMONIE, WIS.

The discussions on the possibilities of manual training work in the rural schools were particularly constructive, coming as they did from men who are conducting this work, and getting results.

The officers chosen for the coming year were: President, C. R. Pickerill, Mangum; Secretary-Treasurer, Geo. E. Davenport, Elk City.

DEDICATE NEW HOME ECONOMICS BUILDING.

Stout Institute at Menomonie, Wis., held on March 30 and 31 an interesting celebration and home coming. It was the occasion of the formal dedication of the new Home Economics Building which cost $250,000 and which competent experts have declared to be the most complete of its kind in the United States. Several hundred alumni from all sections of the United States were in Menomonie during the two days.

The events began Friday noon with an alumni luncheon for all guests and faculty members. It was planned and directed as a thesis problem by six young women of the Domestic Science Department. The luncheon was followed by an informal "mixer" at which students and alumni assembled for music, toasts and speeches. Miss Kittie Bishoff, '05, instructor in the Girls' Vocational High School, Minneapolis, presided in most genial fashion. Among those who brought greetings were Miss Anna McMillan, Assistant Professor of Domestic Art, Lewis Institute, Chicago; Miss Elizabeth Lathrop, Head of the Domestic Art Department, Iowa State Agricultural College, Ames, Ia.; Miss Hattie Dahlberg, Supervisor of Domestic Science, Madison, Wis.; Miss Wilhelmina Spohr, Assistant Professor, Household Arts Education, Columbia University, New York City.

On Friday evening in the Stout Institute auditorium a series of vaudeville stunts was given by the different societies and organizations of the school for the entertainment of the guests. Interesting features representing the varied work and activities of the different associations were presented. Many amusing hits were made and faculty foibles exposed. On Saturday morning a special program was carried out for the benefit of the visitors. All laboratories and shops were open and classes at work. The culmination of the celebration occurred Saturday afternoon when the dedicatory exercises took place in the new auditorium. The principal addresses were given by Dr. Charles McCarthy of Madison, Wis., and Miss Wilhelmina Spohr, graduate and former faculty member of Stout, at present Assistant Professor of Household Arts Education, Columbia University New York City. Brief addresses were made by Mr. H. E. Miles of Racine, President of the State Board of Industrial Education; Mr. C. P. Cary, State Superintendent of Education; Senator A. C. Anderson, Menomonie, Wis.; Mr. J. W. Miller, former State Representative from Menomonie; Mayor John Matthews and President L. D. Harvey.

Saturday evening a huge informal reception was held in the new building. From basement to upper floor the splendid edifice was illuminated and about 1,200 visitors were conducted thru the institution.

Publications Received.

Convention Report. Eastern District, International Association of Teachers of Printing.

This splendid pamphlet includes the convention report of the Eastern Division of the teachers of printing of the United States held in New York City in April, 1916. The pamphlet will be valuable to every teacher of printing who would like to know something of the present tendencies and principles of teaching printing both as a manual training and as a vocational subject.

THE LINCOLN CONVENTION

The plans of the officers and of the local committees of the Western Drawing and Manual Training Association point to an unusually successful convention to be held in Lincoln, May 2-5. Assurances have been received that the program will be rich in content and strong in the list of speakers and that an unusually complete entertainment has been prepared for the association by the school authorities of the convention city.

The Lincoln convention will be the first which the association has held west of the Missouri River and it is predicted that it will be the occasion for the first large, general turnout of teachers of manual training and art in the Dakotas, Nebraska, Colorado, Missouri, Kansas, and Iowa. It is anticipated that the association will benefit much from an intimate contact with the advanced work of the states west of the Mississippi, where especially high grade work has been done without ostentation.

The city of Lincoln is unique educationally, both in its elementary and in its higher school facilities. For example, the Lincoln school board is made up entirely of university graduates and has the reputation of being the most progressive school governing body in the Middle West. The great University of Nebraska exerts a strong influence on the educational life of the community. The official hosts for the meeting will be the board of education, the supervising corps of the public schools, and the commercial club of the city.

The meetings and the exhibitions will be held in the splendid Lincoln high school building, a new structure costing more than $600,000 and affording ample space for both commercial and educational displays.

Lincoln is well situated from a railroad standpoint. The Chicago, Burlington and Quincy and the Chicago and Rock Island Railroads operate direct trains into the city from Chicago. The Union Pacific, the Missouri Pacific, the Omaha Railway, have trains from the north and south, and from the west.

The convention headquarters will be at the Lincoln Hotel, which is a short ten minutes' walk from the high school building. In the immediate neighborhood of this hotel there are four large, first-class hotels which will afford ample additional rooming space.

The Program.

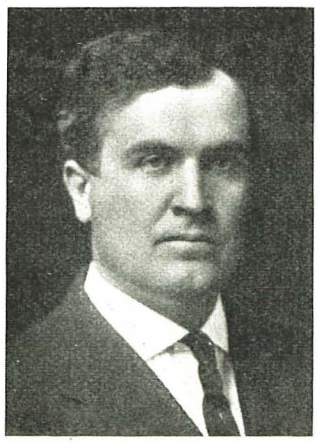
The program which had not been fully completed up to the time of going to press, provided the following addresses and discussions:

General Session, Wednesday Afternoon.

Invocation—Rev. H. H. Harmon.

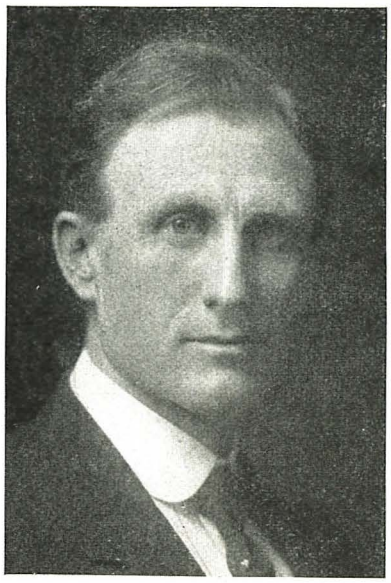
Address of Welcome—Hon. Charles W. Bryan, Mayor of Lincoln.

Response and President's Address—Edward J. Lake. Champaign, Ill.



SUPT. FRED HUNTER MISS MARTHA PIERCE

THE LINCOLN HOSTS OF THE CONVENTION.



PROF. E. J. LAKE,
Champaign, Ill.,
President, Western Drawing and Manual Training Association.

Appointment of Committees.

Closing Address—(To be supplied.)

Wednesday, 3:15–5:00 p. m.

Printing Round Table—Watson L. Adams, Grand Rapids, chairman.

Wednesday Evening, 6:30–8:30 *p. m.*

Annual Dinner (Lincoln Hotel Banquet Room)—Miss A. Vandalaine Henkel, Harris Teachers' College, St. Louis, Mo., toastmistress.

Thursday Morning, 9:00–10:30 *a. m.*

Address—Ruth Mary Weeks, Kansas City, Mo.

The Influence of Home Economics Upon Art Study in a New State, Miss Alice M. Loomis, professor of home economics, University of Nebraska.

Thursday, 10:30–12:30 *a. m.*

Art Round Table—Miss Esther W. Wuest, supervisor of art, Portland, Ore., chairman.

(a) *Drawing in the Public Schools*: What are we teaching? Why are we teaching it? How are we teaching it?—Mr. Royal B. Farnum, state specialist in drawing and handwork for the State of New York, Albany, N. Y.

(b) *Steps to Success*—Modern Standards of Art Instruction. Miss M. Emma Roberts, supervisor of drawing, Minneapolis, Minn.

Thursday Afternoon, 2:30–5:30 *p. m.*

Inspection of exhibits.

Thursday, 5:30–8:00 *p. m.*

Group dinners at Lincoln Hotel, Lindell Hotel, and others. Dinner at high school with program.

Thursday Evening, 8:00–10-30 *p. m.*

Drawing a Necessity, Mr. Royal B. Farnum, state specialist in drawing and handwork for the State of New York, Albany, N. Y.

Address—(To be supplied.)

Friday Morning, 9:00–11:00 *a. m.*

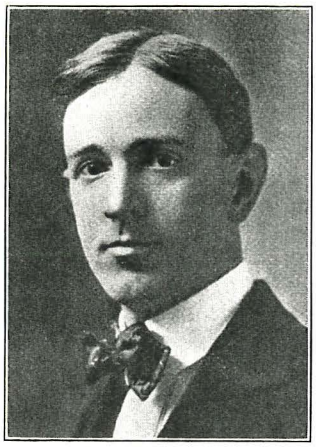
Household Arts Round Table—Miss Araminta Holman, Department of Home Economics, State Agricultural College, Manhattan, Kans.

(a) *Art in Its Relation to the Home and Dress*, Mr. Frank A. Parsons, president New York School of Fine and Applied Arts.

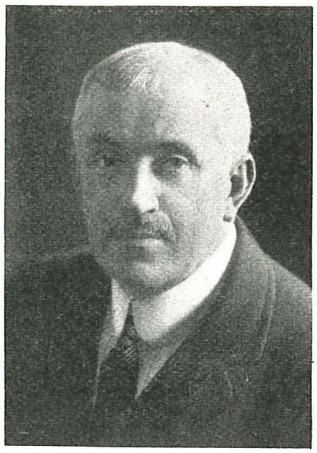
(b) *Teaching Methods in Foods Courses*, Miss Louise Stanley, head of the Department of Home Economics, University of Missouri.

(c) *Costume Design*, Miss Florence Hunt, instructor in costume design, Kansas State Agricultural College, Manhattan.

Manual Training Round Table—Charles H. Bailey, director of manual arts, Iowa State Teachers' College, Cedar Falls, Ia., chairman.



ROYAL B. FARNUM,
Albany, N. Y.



FRANK ALVAH PARSONS,
New York, N. Y.

PROMINENT SPEAKERS AT THE LINCOLN CONVENTION.

(a) *Standards and Tests in the Manual Arts* (illustrated), Ira Griffith, University of Missouri.

(b) *Motion Pictures and Lantern Slides as Aids to Industrial Education* (illustrated), H. C. Givens, State Manual Training Normal School, Pittsburg, Kans.

Friday, 11:00–12:00 *a. m.*

Business Meeting (high school auditorium).

Friday, 1:30–3:30 *p. m.*

Vocational Education Round Table—Charles W. Sylvester, director of vocational education, Hammond, Ind., chairman.

(a) *Vocational Education and Federal Aid Under the Smith-Hughes Act*, Mr. H. W. Kavel, principal of the William Hood Dunwoody Industrial Institute, Minneapolis, Minn.

(b) *Vocational Education in Junior and Senior High Schools*, Mr. Wilson H. Henderson, assistant superintendent of schools, St. Paul, Minn.

(c) *The Productive Shop as Related* (1) *to the Course of Study*, and (2) *to the School System* (illustrated), Mr. J. C. Wright, director of vocational and manual training instruction, Kansas City, Mo.

Friday Evening, 8:00–10:05 *p. m.*

The Value of National Art Education, Mr. Frank A. Parsons, president of the School of Fine and Applied Arts, New York, N.Y.

Address—Mr. S. J. Vaughn, State Normal School, De Kalb, Ill.

Saturday, 9:00–11:00 *a. m.*

Household Arts in New York State (illustrated), Mrs. Anna Hedges Talbot, State specialist in vocational education for women, New York.

Address—(To be supplied).

RELATING MANUAL ARTS AND DRAMATICS.

That manual training and dramatics can be closely associated in any school is being demonstrated at the Kansas State Normal, at Emporia, where the class in furniture construction is designing and making all the furniture to be used in setting the stage for the senior play to be given at commencement.

The class was given only the synopsis of the play for which the settings are being designed. The scenes show a richly furnished living room, a modern office, a committee room and a business directors' room. The choice of furniture and its arrangement in the rooms is left to the class.

Twenty pieces of furniture will be completed. In the living room there will be a davenport, rocker, arm chair, library table, davenport table, small writing desk and chair, wall mirror, fernstand, two table lamps, floor lamp, small table, fireside seat and foot-stools. All of this furniture is to be of walnut. In the office and business rooms there will be an office desk and chairs, hall tree, library tables, book racks and waste paper basket.

Each boy has a certain piece or number of pieces to design according to the general plan, makes working drawings of the design and builds from the drawings. A group of boys are working on the chairs for the offices.

There are twelve boys in the furniture construction class, which is the most advanced in the department. Because of the large number of pieces necessary to furnish four rooms, the elementary and intermediate classes are making some of the smaller articles from the drawings made by the furniture class.

Both departments are well pleased with the arrangement. Prof. F. L. Gilson, head of the expression department, said: "This is what I call the real co-operation of departments." G. K. Wells, instructor of the furniture class, said: "The plan can be used in any school where manual training is taught. Altho manual art is very different from dramatic art, this is only one instance which shows how easily the manual training department can co-operate with another department of the school."—*Arthur Messick.*

BIRD HOUSES.

Gilman Lane, Kalamazoo, Mich.

(See page 190.)

The problem of a bird house gives more freedom to the boys' imagination than any other problem presented in the shop—at least, it does the way it is presented to my pupils. At the same time, the cost of materials is practically nothing, and, taking these things into consideration, the result is highly satisfactory.

In the first place, when the boys were told we were going to make bird houses, they were asked to be able to tell next class time as many different ways as possible how bird houses could be built; they were also instructed to bring a small box from a grocery store, such as packages of yeast, jello, etc., are packed in. This set the boys' minds at work on the subject, and many different ideas were brought up, such as covering the houses with bark, or with twigs, making three-story houses, fastening clay flower pots on boards, hollowing out limbs, etc., some of the boys bringing clippings from magazines showing various ideas in construction.

The first problem the boy had was to decide what particular method he was going to follow; what particular style of bird house architecture, if it may be called that. Then he figured out how his box could best be cut down to make the desired shape. In some cases, the boxes brought were so large they had to be taken apart and rebuilt smaller; others were divided into two or more apartments by partitions. After the gables were cut out, or whatever shape the roof was to be, a narrow strip was taken out on each side under the eaves, for ventilation, and several small holes bored in the peak of the gable, for the same purpose. Then the openings for the birds were made, bored with a 15/16″ bit, as the houses were for wrens.

The next thing considered was the perch or porch, as the case might be. Some of the boys simply put in two pieces of dowel rods with a perch across, while others extended the roof and made a covered porch, with or without railings. Some were left with just a little platform for the bird to alight on.

Nailing on the roof completed the "carpenter work" on the house, and the next problem was that of putting on a covering. Some of them, made of extra thin boxes, were simply painted; on others, bark or a combination of bark and twigs were used. But more of them were covered with bamboo strips, a waste product of a fishing rod factory given to the school. These strips of bamboo were first cut to proper length, using a bench hook in place of vise, and holes drilled near the ends; otherwise the nails will split the bamboo, it is so brittle.

In making these bird houses, it is very evident that it was not necessary for the school to furnish much material; a few thin pieces for the roof and porches were practically all. Of course, not every town has a split bamboo rod factory to donate waste pieces, but in its place there may be some other industry with a waste product just as acceptable. In nearly every place, however, bark is obtainable, either from slab wood or dead trees near town, or twigs that may be put on like logs in a log cabin.

Des Moines, Ia. An automobile department has been opened at the trade school. Mr. R. L. Brewster is instructor.

Salt Lake, Utah. A domestic science department has been opened in the East Side High School.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

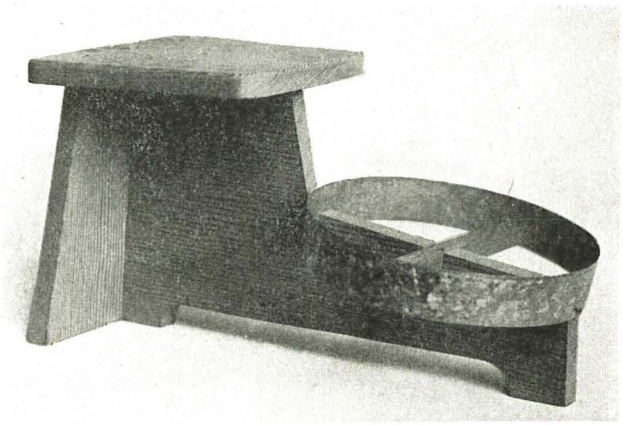
Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A MILK STOOL.

Wm. P. Taugher, Instructor of Manual Training,
Roswell, N. Mex.

The accompanying photograph and drawing of the milk stool, which was constructed under the supervision of the writer, has proven quite popular and practical in summer school work. In rural regions, and in many small towns where cows are kept for family use, this stool is sure to attract interest.



The Completed Milk Stool.

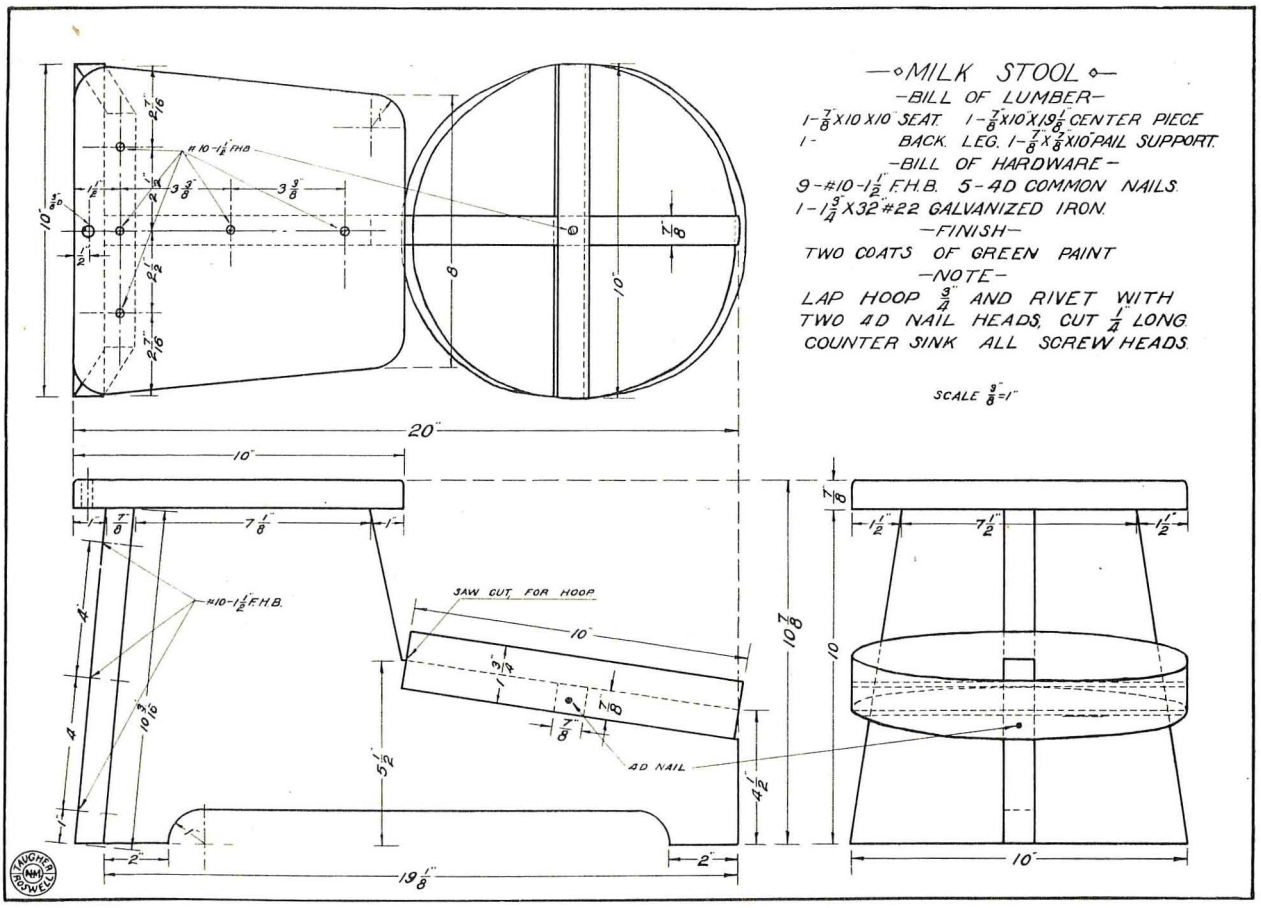
A LUMBER RACK.

C. S. Goldsmith, Supervisor of Manual Arts,
Carlstadt, N. J.

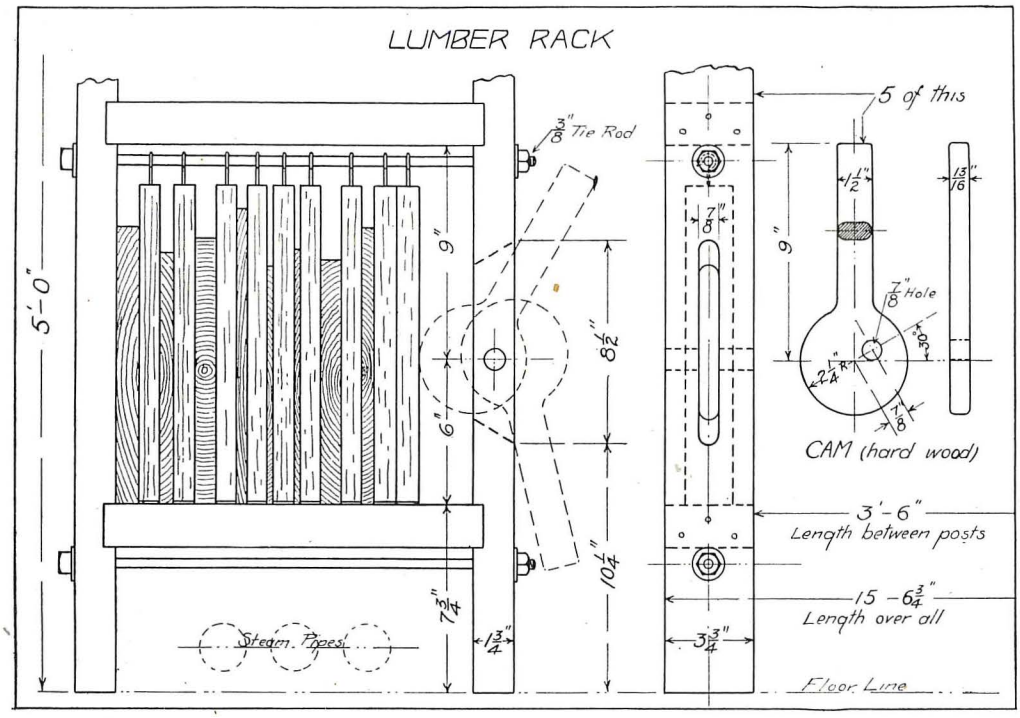
Doubtless I am but one of many teachers of woodworking who experience difficulty in obtaining dry lumber and in keeping it straight. The common method of "sticking" a pile of lumber is all right for purposes of storage, but far from satisfactory when you are constantly drawing upon the pile for daily use in classes—you invariably want the bottom board. Whereas to merely store the lumber in racks, on edge or on end as the case may be, is to invite a series of warpings and twistings sufficient to preclude a subsequent use of the lumber in satisfactory work.

The plan here illustrated is extremely effective both in providing for drying the lumber and in keeping it straight. The construction of the rack is simple, involving no expense beyond the means of the least pretentious of manual training shops.

The use of steam pipes is of course optional, but I have found that the expense incurred in putting them in is more than offset by the saving effected in one year thru buying air-dried stock.



Details of the Milk Stool.



Details of Lumber Rack.

The cam will work effectively in any position, but a sufficient number of sticks should be provided so that when a board is removed from the rack, sticks may be added to take the place of the board. At the end of the week the rack may be replenished.

It will be found necessary to vary certain dimensions to suit local conditions; the purpose of the drawing is merely to present the idea and to give a few essential details.

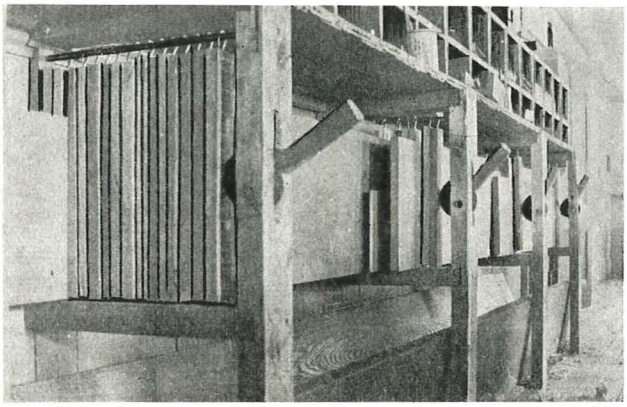
TIE RING.

L. M. Klinefelter, Fort Collins, Colo.

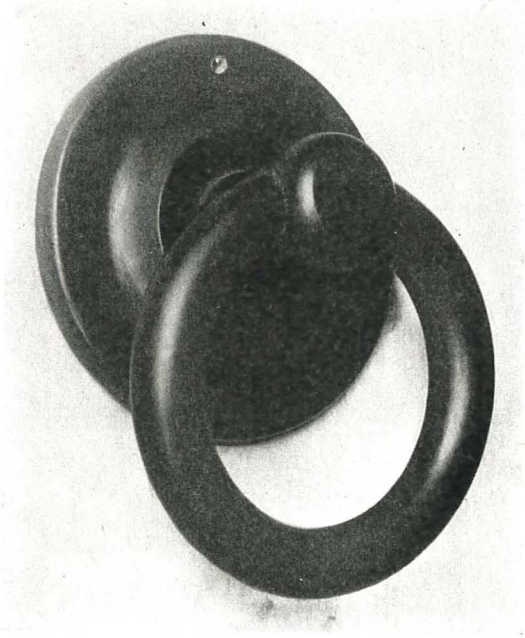
The Tie Ring shown seems especially good as a combination project in wood turning, as it included spindle, face plate and chuck work, and at the same time calls for a small amount of material. This, in some cases, is an important fact. The material used may be any good hardwood, the ring especially calling for straight-grained, sound wood. The ring shown in the photograph was made of mahogany, filled with a dark filler, sanded and polished with shellac and oil.

The ring proper is turned out in the usual manner, using either a pin or cup chuck, tho the latter is usually safer and more convenient. The base is a simple face plate project, and the design may be altered to suit the maker. In making the peg which holds the ring, it has been found best to bore the ¾" hole in which the ring fits, before the piece is put in the lathe. It is then carefully centered so that the hole runs exactly perpendicular to the axis. The piece may be turned up between centers, and chucked for finishing up the outer end when cut off, or it may be fitted into a bell chuck and finished in that way. Any finish desired may be used.

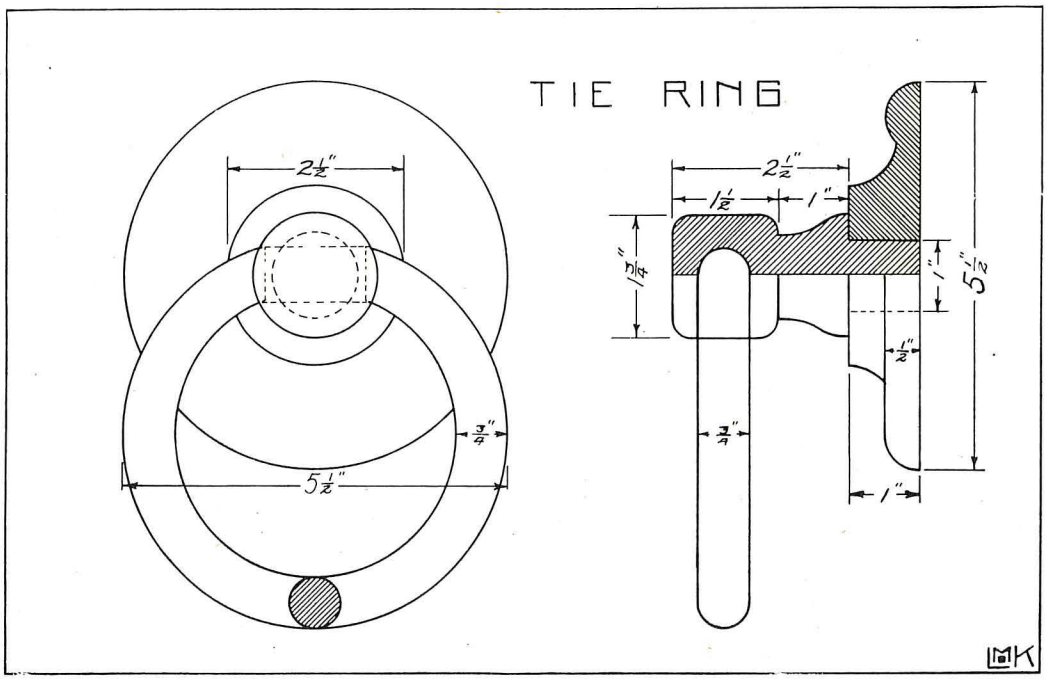
When the turning is completed, a section about 1½" wide is cut from the ring, the cuts being parallel to each other, as shown in the drawing. The top edges of the cuts will have to be trimmed slightly to fit into the hole in the peg. The ring is then sprung enough to allow it to pass over the edges of the holes and the ends drop in place. Considerable care should be taken in this part of the work, and the fact that the ends of the ring must fit in a round hole makes it necessary for the cross-section of the ring to be as nearly circular as possible. The peg is next glued into the base, and the ring is completed.



The Lumber Rack in use.



Turned Tie Ring.



Details of a Turned Tie Ring.

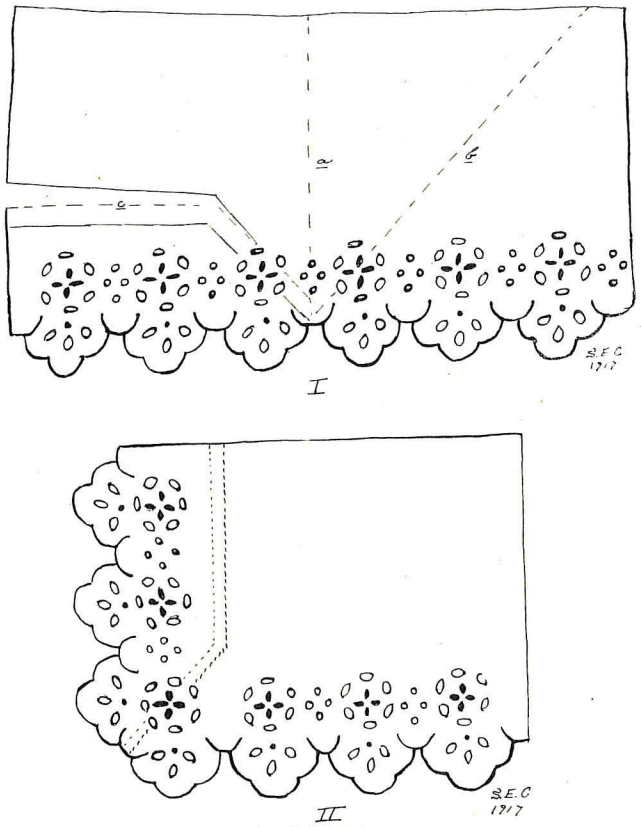
A MITRE.

S. Edith Cole, Instructor in Domestic Art,
Lawrence, Kans.

The making of a mitre in either embroidery, or lace, is a problem not too difficult for a first-year high school girl.

Used on the ruffles of an under-garment, the mitres add materially to the appearance, especially when used with insertion.

An embroidery, with not too elaborate a pattern and having a good button-holed edge should be used, and should be from three and one-half to four inches in width.



Details of Miter.

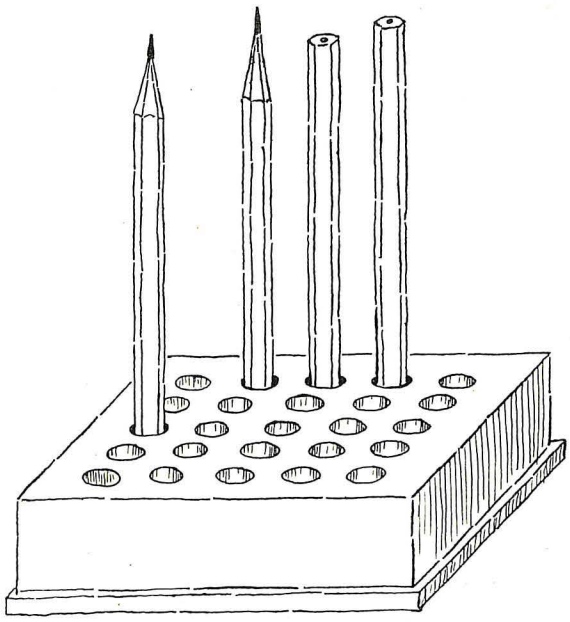
After straightening the upper edge, see how many scallops will be required to form a square. (See Fig. I, line *a*.)

Always fold right side to right side, scallops even, then fold back the corner so that the scallops of the square are at right angles to the edge and extend to the upper edge of the embroidery. This forms a triangle. See Fig. I, line *b*.

Never gather thru a mitre. To bring the fullness in the ruffle nearer the embroidered edge, the material should be folded back three-eighths of an inch from the embroidery, on a straight thread of the cloth. See Fig. II. The folded edges are the sewing lines.

To cut, open out, then cut one-fourth inch outside of the fold and down to the scallop. See Fig. I, line *c*. Then fold back as for the square, baste carefully and hem by hand.

When possible to match the embroidery design perfectly, cut around the design and sew securely. On the wrong



Holder for Drawing Pencils.

Fig. IV.

side, trim off the material one-fourth inch from the first hemming, clip at the angle, fold the raw edge under andhem flat.

All lines must be kept true or the beauty of the mitre is spoiled.

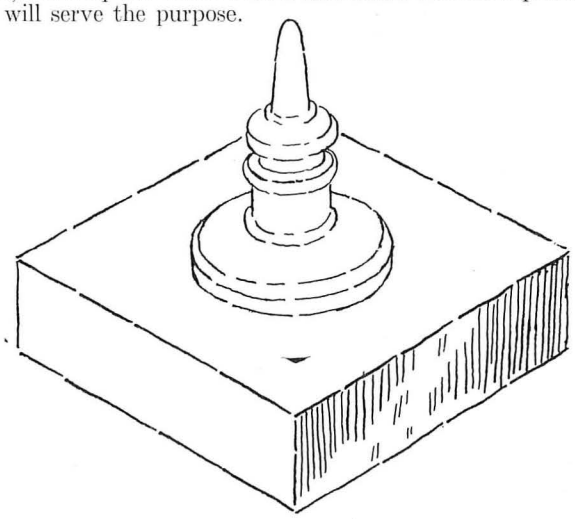
Fig. II shows the completed corner.

Lace is mitred in the same way.

MORE DRAWING ROOM KINKS.

E. M. Wyatt, Houston, Tex.

The floor and drawing benches of most school drawing rooms bear evidence that ink bottles have been overturned. Fig. III shows a simple device which will make such accidents fewer. If the drawing teacher also teaches woodturning, he can have holders made of a more ornamental type, but a square board with a hole bored with an expansion bit will serve the purpose.



A Holder for Drawing Ink Bottle

Fig. III.

Where the drawing teacher has classes of grade students or others who draw but once a week he has probably found it more satisfactory to furnish a set of drawing pencils for general use than to require each student to furnish his own pencil.

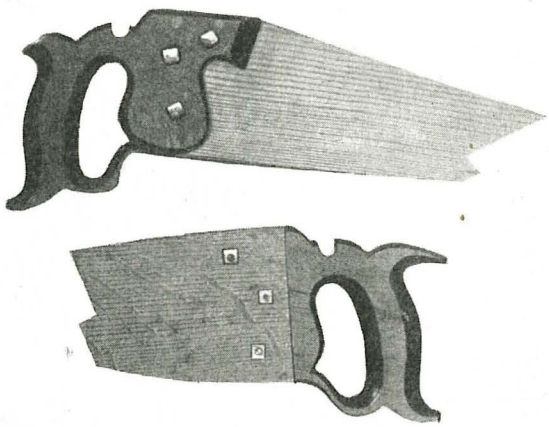
A holder, as shown in Fig. IV, with as many holes for pencils as there are drawing benches will make it easy to keep check on the pencils. A similar holder can be made for erasers.

AIDS TO SHOP SAFETY.

Charles M. Haines, Director of Manual Arts,
Fort Worth, Texas.

Safety devices for the school shop are always in demand and the two illustrated here are especially efficient and easily made.

Saw handles are used for the handles and a piece of hardwood not thicker than 7-16 of an inch is shaped as shown in the photograph. It is fastened to the handle by means of stove bolts or screws so that it may be removed from time to time when it has become too short. The rip saw pusher is 10 inches long and the jointer pusher is 5½ inches long.



Safety Pushers designed by Mr. C. M. Haines.

By the consistent use of these two aids practically all shop accidents on the rip saw and jointer machines will be eliminated.

THE TEACHING OF VENEERING.

To the Editors:

I am a reader of the *Industrial-Arts Magazine* and I was interested in the article on "Veneering" by Mr. Nyman, which was published in your last issue. I think that the following might be of some interest to you in connection with this work.

This article was published in the Veneer, a magazine on veneer and veneering. "A phase of the business, which should have serious attention given to it is that of veneering in the manual training schools of the country. Manual training has become quite a favored item in the schools, and is fast becoming part of every school. Wherever manual training is taught there is generally woodworking done, and the acquaintance the youngsters get with wood and woodwork'ng while they are in school does a great deal towards making them friendly with it in later years. Thus it will help the future consumption of lumber. The idea in mind and the reason for introducing veneer in the school is not that the school will furnish a market for veneer and its products. The reason is much larger than this. It is the familiarity with veneer and its handling, the making of built-up lumber by the boys in the school, which will lead to a wider acquaintance with, and a greater respect for this product in after years.

"This is a good and sure way to popularize the product. Also it is as near the ideal way of educating the coming generation to the veneer product. Of course, the use of veneer in the school will call for a small amount of veneer and veneer appliances, which in itself is worthy of consideration. Back of all of this is the bigger thing the acquaintance of the young people with veneer and its work, at this impressible age and under favorable conditions. This is the biggest reason why veneer should be introduced in the schools, and veneer work kept before them as part of manual training until it has become part of the system in all the schools of the country."

The above piece is the idea, no doubt, of some one who has had experience with people in such a manner as to learn their lack of knowledge of veneer and its products. This is true enough as we know, but all the best furniture of today has to be made with the use of veneer, and we also know many of the people look upon a veneer product as something cheap and to be avoided if possible. If veneer is cheap why do all the makers of the finest furniture in the country use it?

The article by Mr. Nyman and the above both overlook the most important factor in the subject. It is stated that the pupil should be taught veneering while young and impressive, but they fail to consider the fact that the pupil is also a very inexperienced workman at this age. If the authors have had any experience with veneer they know that the gluing of a piece of veneer to the core, or the making of a piece of built-up lumber is the most difficult work met in any gluing, and it takes the most experienced hands and machinery to do this and get good results. We all know how disappointed the pupil is and what his parents think if he takes a piece of work home and it falls to pieces or the veneer peels off in a short time, and not because he did not do his best but because the work was beyond his ability. In many cases the parents do not know that the work is beyond the pupil, they only see the poor work and think if this is a sample of manual training it is not worth keeping in the schools. We all know that manual training has its value in the school, but the people have to have something to show for it, and if all we can show is a poor piece of work we will soon lose the confidence of the people in our work. One school teacher who has been handling all kinds of woodwork in a vocational school said that he did not consider himself able to do a first-class veneer job, because one has to have special experience in this work, and only a very few of the teachers get experience in this phase of the work.

Veneering should never be attempted in the manual training shop unless that of a vocational school where the pupils are learning a trade which requires veneering experience. Sometimes in a technical school a problem is met which requires veneering, such as curved rails on chairs or the rims on tables. Great care should be taken even here to see that the veneer is laid on straight surfaces only and only the most advanced pupils do the work, even then it should not be encouraged.

If veneering is to be taught in the school it should be taught as part of the general education of the pupil. Veneering should be taught with the aid of the picture screen and not as something to be done in the shop.

George W. Cleaveland.

Memphis, Tenn., March 5, 1917.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Trades and Industries of the United States.

602. Q.—Can you inform me of any book which takes up the description of the different trades of this country and gives information as to wages paid, etc.—*O. M.*

A.—The following books will be found helpful:

Weaver and Byler's Profitable Vocations for Boys, $1, A. S. Barnes Co., New York; *Ayres' Constant and Variable Occupations*, Russell Sage Foundation, New York; *Wheatley's Occupations*, Ginn & Co., Boston; *Parsons' Choosing a Vocation*, Houghton Mifflin Co., Boston; *Wingate's What Shall Our Boys Do For a Living?* Doubleday & McClure, New York; *Reid's Careers for the Coming Men*, Saalfield Pub. Co., New York; *Wage-Earning Occupations for Boys and Girls*, ten cents, Students' Aid Committee of the New York City Schools; *Munsterberg's Vocation and Learning*, Peoples University, University City, St. Louis, Mo.; *Puffer's Vocational Guidance*, Rand McNally Co., New York, Chicago.

Period Furniture Design.

603. Q.—Can you inform me if the drawings of any of the furniture designed by Chippendale or other great masters can be procured?—*H. C.*

A.—The following books contain prints such as you desire:

Furniture Designs of Thomas Chippendale, George Hepplewhite, and George Sheraton, $15, American Architect, New York, N. Y.; *Furniture Designs of Thomas Chippendale*, $6, American Architect, New York, N. Y.; *Furniture Designs of George Hepplewhite*, $6, American Architect, New York, N. Y.; *Louis XV Furniture in the Louvre*, by Egon and W. Hessling, $10, American Architect, New York, N. Y.; *English Furniture of the Eighteenth Century*, by Herbert Cescinsky, $50, net, Funk & Wagnalls Co., New York; *Louis XIV Furniture of the Louvre and Museum of Decorative Arts*, by Egon and W. Hessling, $13.40, Grand Rapids Furniture Record Co., Grand Rapids, Mich.; *Book of Decorative Furniture*, by Edwin Foley, 2 vols., $15 per set, Bruno Hessling Co., New York, N. Y.

Floor Finish.

607. Q.—We have just about completed a new high school building and I am asking for advice in regard to the finishing of floors which are all hard maple. A coat of raw linseed oil has been put on and the workmen and visitors have already tracked into it much dirt.—*M. E. C.*

A.—Your last inquiry happens to cover the most difficult problem of all inside work. However, having studied this proposition from several points of view and since I have recently completed a contract for inside work on the new College of Forestry where a proposition very similar to the one mentioned above was under consideration, I believe that the following solutions may be specified according as the board of education affected may care to appropriate for the work:

In writing the specifications for the new College of Forestry at Syracuse University, the problem as presented to me was as follows:

The floors were of rifted Georgia pine and were to be preserved against the loosening of the fibers by moisture and dirt and were to be rendered as easily cleaned as possible with hair brooms. It was further stipulated that the annual treatment was to be inexpensive and that discoloration because of dirt need not necessarily enter into consideration.

With these facts at hand, I first specified that the floors be machine sanded across the grain with No. 2½ Garnet paper and finished with the run of the floor with No. 1 paper. Following this two coats of raw linseed oil, containing one-half pint dark Japan drier to five gallons of oil, were to be applied hot, five days being allowed between coats. This has given them a very satisfactory floor capable of being mopped and proof against splintering because of the disintegrating action of water upon the fall and spring growth of pine. This floor will, however, become badly stained in time but will continue to be easily cleaned. If your correspondent so desires, he may follow the above outline and probably will, because of the fact that boards of education are not prone to pay very much attention to the looks of school floors; especially since the law requires that all school floors shall be oiled with an approved mineral oil of high flash point, at least once a term.

The second alternative and really the most satisfactory, as far as appearances and durability are concerned, is as follows:

Machine-sand the floors as directed under the specifications for pine (the New York College of Forestry floors were sanded by two machines, one electric, the other gasoline, both of which contracted at one and three-fourths cents per square foot). Dust the floors very carefully, then proceed to apply a coat of varnish, preferably Pratt & Lambert's No. 61, allowing this coat one week to dry. This should be followed by a second, and a third coat if funds will permit, being sure to allow one week before the floors are used. This will give a most enduring floor, light in color, but must be renewed each summer.

Before the new varnish can be applied over the old, however, it should be specified that the oil and dust of the past term be washed from the floor with Gold Dust and hot water, making sure that the soap solution is thoroly removed with plenty of clean water. The floor should then be allowed one week in which to dry before receiving two coats of new varnish. This treatment will remove the accumulated grease and dust of the past term, bleach out the worn spots to a greater or less exent so that what little sanding is necessary will not be a large factor in the contract price. If the requirements of the state from which your correspondent writes, make it necessary that the floors be oiled, I should seriously object to the varnish method, since the mineral oil will stop the oxidation process of the varnish, causing it to disintegrate and rub away as it becomes softened. On the whole, as long as it is necessary that we use wooden floors in the schools, the method given under the specifications for the College of Forestry is the most satisfactory. Until we have developed a new universal material which will supersede our wooden floors we must expect to be required to mop and oil the floors, simply as a matter of effectively keeping down the dust.—*Ralph G. Waring.*

Classification and Grading of Lumber.

608. Q.—Please put me in touch with any information on classification and grading of lumber you may have at your disposal.—*R. B. M.*

A.—See *Lumber and Its Uses*, by R. S. Kellogg, price, $1, published by the Radford Architectural Co., 178 W. Jackson Blvd., Chicago. The complete rules for grading specific woods vary somewhat according to the rules of the several lumber associations and may be had from the associations. We question whether there would be any value in teaching all these complete rules.

Books on Surveying.

609. Q.—Can you tell me where I can get a modern book on surveying, simple enough for high school work? —*C. H.*

A.—The following books will be found helpful:

Breed & Hosmer's Principles and Practice of Surveying, $3, John Wiley, New York; *Ives' Surveying Manual*, $2.25, John Wiley, New York; *Nugent's Plane Surveying*, $3.50, John Wiley, New York; *Tracy's Plane Surveying*, $3, John

Wiley, New York; *Webb's Problems in the Use and Adjustment of Engineering Instruments*, $1.25, John Wiley, New York; *Johnson and Smith's Theory and Practice of Surveying*, $3.50, John Wiley, New York; *McCullough's Practical Surveying*, $2.50, D. Van Nostrand Co., New York; *Williamson's Surveying and Field Work*, D. Van Nostrand Co., New York; *Pence and Ketchum's Surveying Manual*, $2, Munn & Co., New York.

Refinishing Furniture Damaged by Fire.

620. Q.—Could you tell me the best way to remove a burnt varnished finish from mahogany victrolas and the best means to restore their original finish? The varnish is blistered due to excessive heat in a fire which destroyed the building. The wood, however, was unharmed and is in good condition.—*W. M. B.*

A.—I would suggest the following method based on similar experience with piano cases: Make up a remover from one quart of denatured alcohol and one quart of benzol. Place these materials in a clean varnish can, cork and immerse the can in boiling water until quite hot, being careful that the resulting gases do not force the cork out and come in contact with an exposed flame. When sufficiently heated, add a quarter of a pound of grated paraffine, shake the can until the three materials are thoroly mixed, then hold the closed can under cold running water, shaking until a cold emulsion is produced. Dissemble the Victrolas as far as possible, removing all brass or other fixtures, taking these pieces separately and starting on what is naturally the inside face; cover the work carefully with a thick layer of the varnish remover, same to be applied with any old worn out but clean hair brush. This work should be done in a warm, but not hot room, free from draughts to prevent the too rapid evaporation of the remover material. As soon as the varnish blisters and peels, which will occur within ten minutes, remove this material with a broad or narrow putty knife, according to the shape of the surface. A good workman will endeavor to keep this varnish which is being removed, as dry as possible under the circumstances, as the amateur invariably slops on an excessive amount of remover. The putty knife should be wiped on pieces of burlap or bagging which have been cut with a chisel or knife to about 8″x10″. These should be thrown into a metal container as fast as used, and when all cleaning work is done should be thrown into the furnace, as solvents of this type flash at very low temperatures. After all the varnish has been removed from the entire case, inside and out, make a picking-stick of beech or maple with a long, round point on one end and a half-inch skew-chisel point on the other end. With this instrument clean up all corners, beads, fillets, or carvings and then proceed to saturate several pieces of burlap with denatured alcohol and wash the entire case therewith; this latter to insure the removal of any trace of greasiness left by the remover. Should this be carelessly done, there is a chance that the varnish will sometimes scale. Let the case dry over night and then sandpaper carefully with 00 paper. Should any light spots show as a result, go quickly and carefully over the case with a stain, made from one ounce of Bismarck brown (water soluble aniline) boiled in one gallon of vinegar. Use this stain hot and, to insure its striking in, add one cup of alcohol to the gallon of material. Apply this in full body, using the rule: "Start with the thing you see the least and end with the thing you see the most," to guide you in laying off both the staining and varnish work. This latter should be done in a warm, dust-free room with a temperature which averages 75°F. The varnish for this work should be Pratt & Lambert's No. 61, applied in four coats, not too heavy, but well brushed out, using a 3″ black China or badger-hair brush. Allow one week between coats, sand the first with 00 paper, rub the last two with 0 and F pumice stone, felt pad and water. Let the last rubbed coat dry one day and polish with the following mixture: To one quart of vinegar, add one-half pound rotten stone and one-half pint of either crude oil or "3 in 1." Apply this with a pad made of old billiard table felt or any dense, heavy cloth material. Be careful to polish only with the grain of the wood and not in circles as is erroneously advised in some books on finishing. If these directions are followed as given, and the work is done in a neat and thoro manner, there should be no evidences of the former destruction of the finish.—*Ralph G. Waring.*

Finish for Table Tops.

624. Q.—Would you kindly inform me if there is a method for acid-proofing oak table tops; if so, please give the formula.—*T. I. K.*

A.—See June, 1916, *Industrial-Arts Magazine*, page 280.

Finishing Mahogany.

625. Q.—Will you please tell me how to finish mahogany very dark without losing the red color of the mahogany stain? I have used Johnson's dark mahogany and have added Flemish to get the darker effect but it is not satisfactory. —*R. B. C.*

A.—The effect desired in having the red color dominant over the darker background, can only be obtained thru the use of two stains, applied separately. For instance, the effect often desired is to have either red or brown show, one over the other. This is accomplished by applying the color least desired first. In the present instance, the best procedure would be to apply a dark brown water stain, produced from seal brown and jet black Nigrosine, two ounces and one-half ounce respectively to the gallon. Apply this stain, let dry and coat with a second stain made from two ounces of Bismark brown, boiled in one gallon of vinegar. Be sure that all materails are mixed in glass or granite ware. It is best to try the effect produced on sample boards. In this way one can soon judge with a little practice, what is necessary to add in order to produce a definite color. A lot of valuable information is gained in such experimental work and if the material and the dilutions are recorded on the back of each sample panel, the experimenter will soon become fairly adept in matching colors. This work must be done, however, in a careful, systematic manner with a definite purpose in mind. The results will be directly in proportion to the care and effort exercised in the work. From a few concentrated, pure colors, such as can be bought from the Walter K. Schmidt Company of Grand Rapids, Mich., almost any color can be produced with a little systematic experimental work.

It should be remembered that many of the most beautiful and transparently rich effects are not accomplished in any haphazard, slap dash manner. They are produced, however, thru the use of a certain definite color as an undertone, over which is laid a reduced stain of the overtone color. It is thru the use of this process that I have been able to produce colors, on many cheap woods, which cannot in any way be produced by anilines. Were they to be applied in one coat, the results would be surprising and proportionately hideous. It is for these reasons that I advocate a little time well spent in the study of stains and materials among manual training teachers in general.—*Ralph G. Waring.*

Books on Iron and Steel.

628. Q.—Please give me the title and publisher of the best book on the manufacture of iron and steel giving different methods.—*W. A. S.*

A.—A very good book is *The A. B. C. of Iron and Steel.* ($5.) Published by the Penton Book News, Penton Building, Cleveland, Ohio. *Iron and Steel Handbook.* (Machinery Handbooks; price, 25 cents each.) Published by the Machinery Magazine, 140-148 Lafayette St., New York, N. Y. —*T. F. G.*

Books on Boat Building.

627. Q.—Can you tell me where I may obtain plans for a row-boat such as might be built by a boy in manual training?—*R. E. M.*

A.—We are unable to give you the name of a firm that will supply blueprints or working drawings for building a boat. However, any of the following books will be of help to you:

Boat Builders' Series. Oliver Optic. $1.25 per volume. Lothrop, Lee & Shepard, Boston; *Manual Training Toys for the Boy's Workshop.* H. W. Moore. Manual Arts Press, Peoria, Ill.; *Building Model Boats.* Paul Hasluck. 50 cents. Funk & Wagnalls Co., New York; *Practical Boat Building for Amateurs.* Adrian Neison. $1. Munn & Co., New York; *How to Build a Row-Boat.* E. B. Schock. 50 cents. Munn & Co., New York; *Boat Building.* D. C. Beard. Chas. Scribner's Sons, New York.